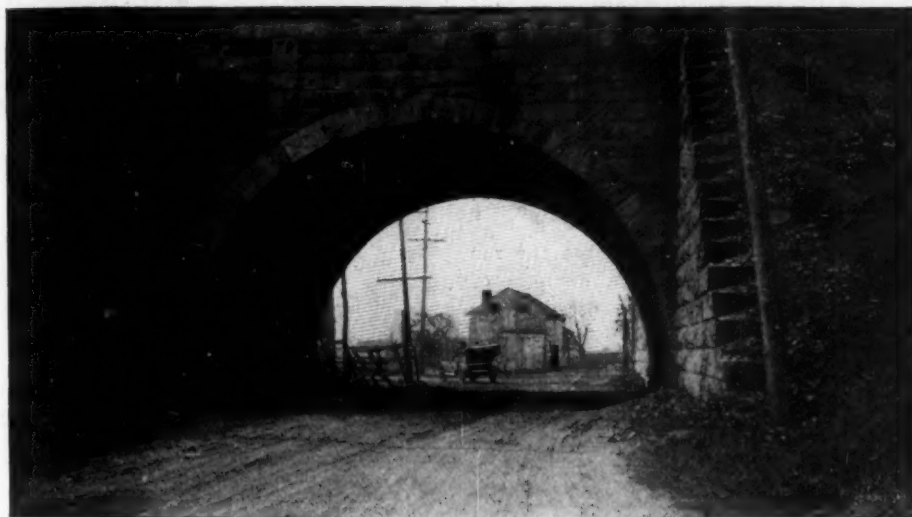


MOTOR AGE

GLIDDEN TRAIL WINDS INTO MASSACHUSETTS



GOING OUT OF HARRISBURG

AFTER 15 days of mud-plugging, climbing mountains, plunging through small streams, making detours to escape steam rollers and torn-up roads, filling up ditches with rocks, fence rails and planks, and also speeding over mile after mile of the famous highways of Massachusetts—the big six-cylinder Premier pathfinder has laid out 8 days of the 1908 A. A. A. tour, making a total of 1,059.5 miles. The odometer, however, shows 1,361 miles. The difference is the distance traveled by the Premier on wrong roads, etc. The days are now laid out are:

	Miles
First day—Buffalo to Cambridge Springs...	117.4
Second day—Cambridge Springs to Pittsburg	110.2
Third day—Pittsburg to Bedford Springs	106.4
Fourth day—Bedford Springs to Harrisburg	107.3
Fifth day—Harrisburg to Philadelphia	135.5
Sixth day—Philadelphia to Milford	132
Seventh day—Milford to Albany	158.5
Eighth day—Albany to Boston	194.2

The pathfinder had laid out a route from Harrisburg to the Delaware water gap, eliminating Philadelphia, when the Premier was ordered back to Harrisburg, a distance of 130 miles, to lay out a new route from that city to Philadelphia. The fifth day's run of the tour as mapped out will undoubtedly be one of the easiest of the whole tour. Leaving Harrisburg the route is along the Susquehanna river to Steelton and past the Steelton mills and furnaces and by the mammoth Pennsylvania steel works. The fifth day's run was

LEWIS, BRADLEY, McNAMARA



the first the Premier pathfinder was enabled to make any fast time. The roads were excellent and are practically macadam the entire distance, with the exception of a few stretches of clay. The clay road, however, is in excellent condition and fast time can be made by the contestants. The route selected by Secretary Lewis is a zig-zag course. It includes Marietta, Lancaster, Reading and Pottstown. The route is far superior to that which was laid out direct from Harrisburg to Delaware water gap. There practically are no hills to speak of and the only drawback is over the Marietta-Lancaster pike, where many water breakers predominate and about half a dozen toll gates will be passed through. The rubber raincoats, sweaters and other heavy clothing and heavy clothing were packed in the suitcases and in their place the lightest of clothing and dusters were worn. A limit of 6 or 7 hours will probably be the maximum of this day's run. This, however, is yet to be settled by Chairman Hower. The tourists should begin to arrive at Philadelphia about 10 o'clock, which will give them ample opportunity to rest. The Quaker City Motor Club is enthusiastic because Philadelphia has finally been chosen as a stopover. The club's headquarters are in the Walton, where the tourists remain over night and these clubrooms



INVITING STRETCH ALONG BANK OF THE CHARLES RIVER

will be thrown open to the tourists. The club will entertain with a smoker. The run from Harrisburg to Philadelphia is through beautiful scenery, but the main attraction will be the excellent highways and the fast time which can be made.

One of the most picturesque runs is that between Philadelphia and Milford. This will take the contestants through Allentown, Bethlehem, Nazareth, Easton and through the gap. There are a variety of roads, but macadam predominates. The mud-plugging trip at this point turned into a dust-eating one, as very little mud was found, but much time was lost in crawling over recently-laid trap rock, dodging steam rollers, mule teams loaded with road materials, etc.

From Philadelphia to Three Churches, a distance of 93 miles, the tourist will find some of the best highways in Pennsylvania. It is said that all the roads which are now torn up and in process of construction will be finished before the tourists arrive in this section. Several stretches of brand new macadam were run over by the pathfinder and they were all in excellent shape, well rolled and are made similar to the famous New England highways. These new roads have no water breakers but on the Allentown pike from Philadelphia there is a great quantity of them. On this pike there are eight or ten toll gates, the tolls ranging from 3 to 10 cents. If the route book is not closely followed, many of these toll gates are liable to be overlooked, due to the smallness of the signs which are set in inconspicuous positions. It is very amusing to study the various women who take the tolls—some are ugly, others jolly, some fat, lean, broad, tall, red-headed and some were weazened features, and range from 20 to 60 years or more. Some do not welcome the coming of the Glidden tourists, while others are willing to do all they can

to help the motor cars lose no time. At Easton the course lies parallel with the Delaware river which is followed off and on to the gap. While the scenery is fascinating around Boston, its real grandeur is not really seen until Three Churches is reached. This town is on a hill and from it the gap can be seen 7 miles away with miles of sweeping valleys, nature in full bloom, hundreds of various-colored trees, grasses and blossoms. The scene is inspiring and at each leap of the big six-cylinder the scenery grew better and more beautiful.

From Portland to the gap, a distance of 5 miles, the road becomes very narrow and winding. On one side are great towering mountains with overhanging cliffs, while on the other is the Delaware, Lackawanna and Western railroad and beyond the railroad lies the Delaware river and still further on lie other peaks. The two highest, which form the gap, are Mount Minsi and Mount Tammany.

There is no question but that the run from Milford to Albany, a distance of 138.5 miles, will be one of the best of the 14 days' contest. Up to Boston it is the hardest yet laid out. The principal towns through which the route goes include Port Jervis, Middletown, Newburg, Kingston, Saugertis, Catskill and Athens. The roads from Milford to Albany are over a combination of macadam, clay and dirt interspersed with many twists and turns and steep hill-climbing. The only speed trap which the pathfinder has encountered since leaving Buffalo is a mile south of Port Jervis after leaving Milford. At Milford the scouts were warned by hotel proprietors and others that an obnoxious constable secured \$2 for each arrest over the best macadam roads between Milford and Port Jervis. Heeding the warning, the car crawled at a snail's pace over this course and was not bothered.



BETWEEN HARRISBURG AND ANCHOR

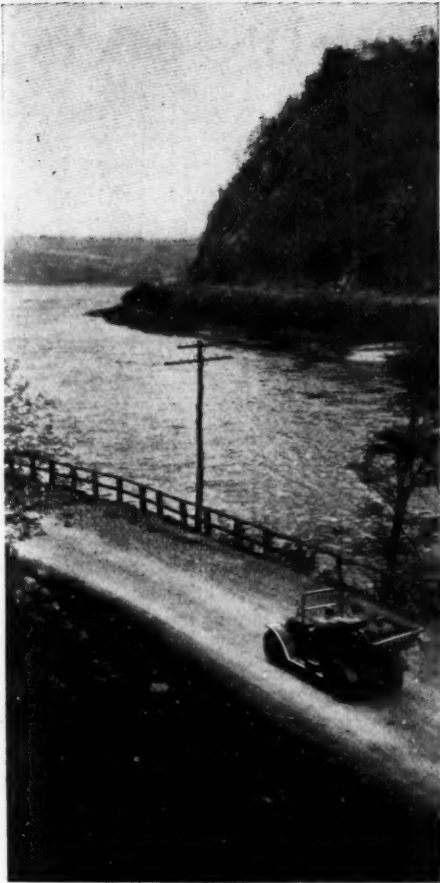
At Port Jervis the regions of oil, coke, coal and steel were left behind and the great Empire state was entered. It was with a thrill of joy and satisfaction that the terrible roads of western Pennsylvania became a thing of the past. After leaving Gutterback, mountain-climbing was renewed and continued to Otisville for 4 miles. This is one steady climb with many sharp and dangerous S and hairpin turns. The roads are rocky and very narrow in this section.

At Newburg the Hudson river comes into view and it is unquestionably the grandest waterway that will be seen by the contestants. It was the intention to cross the river from Newburg and continue through Poughkeepsie to Albany, but upon searching Newburg it was found the only way to cross the Hudson was by ferries and as this would delay the tourists it finally was decided to continue on the west shore. A noticeable thing which was brought forcibly to the attention of Lewis after being in New York state, was the utter lack of signboards and a great number of forks and crossroads. In this respect Pennsylvania is far superior to the Empire state. Many hours were lost in New York state groping a way about on country roads, stopping the car and inquiring the way of farmers.

When Port Ewen was reached, 1½ miles from Kingston, the ferry proposition again cropped up, which necessitated a detour of 5 or 6 miles into Kingston. The roads up to Kingston were in very good condition,



STOP AT OLD SAW MILL NEAR JACOB'S LADDER



FINE STRETCH ALONG THE DELAWARE

but after leaving these the roads were as bad, and in some places worse than anything through which the big Premier had plowed. Water was running in rivers by the roadside and the soft clay roads were nearly impassable. The Glidden scouts were warned by farmers that the roads were in fearful condition and one of them jokingly made the statement that he would bet his best team of horses against the pathfinder that the car never could reach Albany. Like the farmers of western Pennsylvania, those in this vicinity "repair" the roads by throwing the sod into the middle of the highway, leaving it there to be trampled down. In the vicinity of New Baltimore the Premier was ditched for the first time. For 2 hours the crew worked at filling up the ditch with rocks, rails from the nearby fence and boards borrowed from a farmhouse half a mile away. For a time it looked as if nothing but horses could get the car out of the quagmire. But by perseverance and persistency Driver McNamara landed the car at the top of the hill. Chains were of little use in the soft clay and the rear wheels spun around inside the chains.

Between Kingston and Albany the Catskill mountains were continually in sight on one side, while the beautiful Hudson river was on the other. As the scouts came through this territory the Catskills had for a background a black and threatening sky, while in the foreground were heavy clouds slowly winding away up the

mountainside, gradually reaching the top and could be seen slowly descending the west side of the mountain.

The roads in the vicinity of the Delaware water gap are constructed of shale which is taken from the mountain side and packs down like cement. It resembles the famous shell roads of Cape Cod, Mass. The Bluff house at Milford, where the tourists will stop on the night of their sixth day, is a beautiful spot. As its name implies, it is situated on a high bluff, beneath which flows the winding Delaware river. Beyond the river and the valley lie the blue mountains. The valley is dotted with fertile lands and farmhouses. There is no more beautiful spot west of the Mississippi.

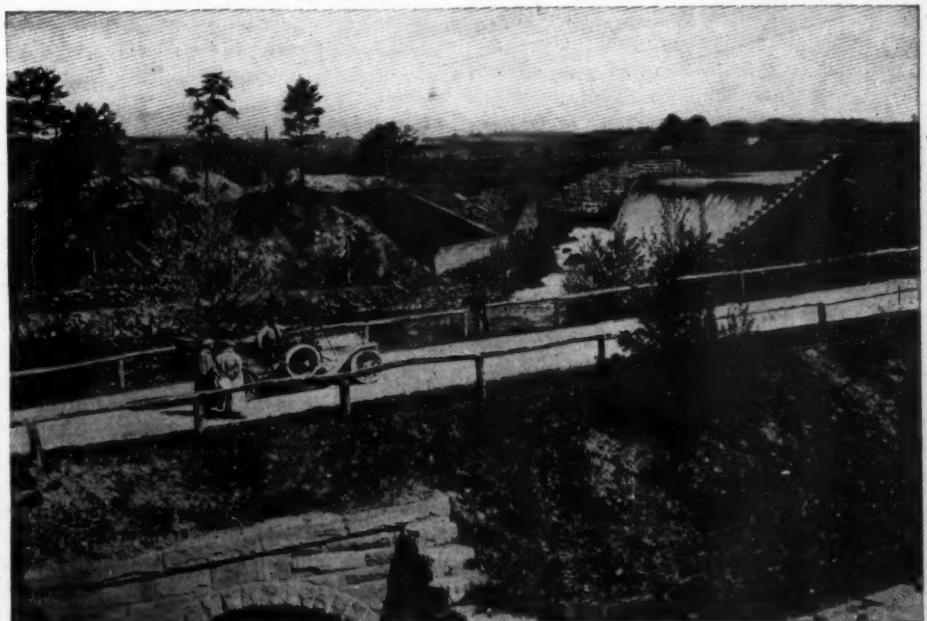
There are two predominating features of the eighth day run from Albany to Boston, a distance of 194.2 miles. Albany is left by driving over the drawbridge and into Rennsalaer. The contestants are liable to be held up some time at this drawbridge and the pathfinder had to wait almost 20 minutes. For 8 miles the route is over macadam roads and then the route is over common dirt and clay roads. A direct line is taken to State Line, into Massachusetts. If for no other reason, the pathfinders knew they were in Massachusetts because of its beautiful state highways. With the exception of a stretch of about 5 miles in the vicinity of Jacob's Ladder, the finest roads in the United States are gone over. There are few tourists who do not know of the beauty of the Berkshire hills. There seems to be something totally different in the Berkshire scenery as compared with that of the Allegheny regions. The route from State Line to Boston is considerably different than that generally used by motorists. It leads through West Stockbridge, Stockbridge, East Lee, Chester, over Jacob's Ladder, Huntington, Fairfield, Westfield, West Springfield, across the

Connecticut river into Springfield, Wilbersham, a detour of 6 miles to Three Rivers, due to road construction through West Brimfield, through Brimfield, Warren, the Brookfields, Spencer, Worcester, Shrewsbury, Northboro, Marlboro, Sudbury, past Wayside Inn, made famous by the poet Longfellow, Wayland, Weston, via Commonwealth avenue to Hotel Somerset, where the night will be spent.

The pathfinder was met at the Worcester Automobile Club by Manager Johnson, of the Premier Boston branch, and J. C. Kerrison, of the Bay State Automobile Association. It is probable that the run from Boston will include the famous north shore drive through Prides Crossing, Manchester, Magnolia, Gloucester, around Cape Ann and north to Portsmouth, Me., and while the route will take the pathfinders through New Hampshire and Vermont with a probable finish at Saratoga Springs, New York or Buffalo.

RACE FROM COAST TO COAST

New York, May 18—The New York Times, the promoter of the American end of the present New York-to-Paris contest, now proposes an across-the-continent-and-back stock car race. The idea received much initial encouragement at a meeting of makers, importers and dealers, and some others high up in the sport and industry, held last Friday evening; in fact, the meeting resulted in the appointment of Jefferson de Mont Thompson, A. R. Pardington and Robert Lee Morrell as a special committee to suggest rules for the contest. It is proposed to start the race on August 15 and run it to the Pacific coast, returning by a different route, so that as many big cities and as much varied territory as possible may be covered. It is understood that the New York Times proposes to enlist the co-operation of fifteen other newspapers in important cities en route to divide both the expenses and the work.



VIEW FROM ROAD OF DAM IN CHICOPEE RIVER

RECORD-BREAKING RUN OF WHITE ON COAST

SAN FRANCISCO, CAL., May 14—The recent run of the White steamer to Los Angeles and back, when the time for the journey to the southern city was cut to 17 hours 17 minutes and a record for the round trip of 37 hours, was established, is considered the most remarkable demonstration of the power of the modern motor car ever given in this state. It is doubtful if a better record over as trying a course ever was made anywhere. Including all stops for gasoline and the delay of more than an hour at Los Angeles before starting on the return trip, the car averaged 27 miles an hour for the entire thousand miles traveled. The run down was made at the average rate of a little more than 29 miles an hour. Over mountain ranges and through long stretches of rough and sandy roads, along narrow highways where stops and delays were frequent because of sharp turns and passing vehicles, the big car traveled at a speed which practically equals that of the fast trains. During most of the journey it maintained the schedule of the express trains and had it not been for the fact that the driver lost the road and wasted an hour that schedule would have been beaten.

The car started from Market and Guerrero streets in this city at 3:02, with William Wagner at the wheel. Fernando Nelson, the owner of the car, and two other persons were in the machine. As the word was given the car quickly gained headway and in less than 10 seconds was flying over the smooth pavement at a speed of more than 30 miles an hour. For the first 10 miles the road lay over the hills along the southern boundary of the city where the road is deeply cut by the heavy traffic and fast time was impossible. When the level stretches of the valley were reached Wagner opened wide his throttle and, traveling 60 miles an hour, San Jose, 50 miles away, was passed in railroad time. Thirty miles away down the valley Gilroy was reached before day broke and while the car made faster time after daylight increasing traffic on the road caused some delay.

At Soledad, which was reached exactly on schedule time, Wagner was relieved by Bill Slimmon, one of the nerviest and most careful drivers on the coast. The roads from here to Los Angeles were not as good as on the first part of the run and frightened farm teams caused delay in several places. A road repair gang blocked the way for a time. Then gravel checked the speed of the car. In spite of these numerous obstacles, Slimmon pulled his car into San Luis Obispo only a few minutes behind schedule time.

With half the distance covered the big car was in perfect shape. It was practically on schedule time, but the worst of the road lay beyond. After a delay of



CUP WON BY WHITE STEAMER

HISTORY OF THE RECORD

	H.	M.
1904—Packard	36	00
1905—Rambler	32	22
1905—Pope-Toledo	24	30
1905—White	21	12
1906—Franklin	21	07
1906—Columbia	18	13
1908—White	17	17

20 minutes to take on gasoline and permit of a hasty lunch for the men in the car, Al Piepenburg relieved Slimmon at the wheel and the car rushed away on its journey. For 40 miles out of San Luis Obispo the road was rough and sandy and then came the mountains. In one stretch of a dozen miles there are at least fifty sharp ascents followed by steep dips down into canyons. Over this road the machine made good time, although there were frequent stops to permit teams to pass. Desperate chances were taken by the racers at times in order to make up time. On the latter part of the road an average of 50 miles an hour was maintained over a long stretch and Santa Barbara was reached almost on schedule time in spite of delays, and Captain H. D. Ryfus took command of the racer.

It was the last lap of the contest with time and down the smooth boulevard the throbbing engine sent the machine toward the hills that loom in the distance. Scores of teams containing persons who had been to see the fleet at Santa Barbara crowded the road. In one place it was necessary to stop and wait for three motor cars to pass down a narrow piece of grade. Then

a long stretch of road that had been plowed by the repair gang was struck. Here was made the only serious mistake of the trip. Ryfus sought by making a detour to avoid the bad section of road and in his effort lost his way. It was 40 minutes later when the racers found their way back to the road they had left. An extra 25 miles was covered in this detour. With the goal in sight the race through the home stretch began. Where the road was fair the throttle was thrown open wide and the car bounded along at railroad speed. A thousand people were gathered in front of the Times office as the dust-covered steamer rushed up the street to the finish line and watches showed 8:19. The distance had been covered in 17 hours 17 minutes and 56 minutes were cut from the record of the Columbia, which had stood for 2 years, although a dozen attempts had been made to break it. But Nelson was not yet satisfied. He was determined to make his car complete the round trip. No machine had succeeded in accomplishing this difficult feat. With a delay of a little less than an hour to secure gasoline oil and water, the car started back over the route it had come. A dense fog that hung over the road for 10 miles just outside of Los Angeles delayed travelers. Although no attempt was made on the return trip to equal the time recorded on the journey down, the car was kept going at lively speed whenever the road would permit. A puncture, the only one during the trial, cost 10 minutes, and taking the wrong road caused further delay.

It was not until the car had passed Soledad on the return journey that Nelson's son, who had taken the place of his father, decided to let out the machine. San Jose was reached at 4:24 in the afternoon and only 50 miles of good road remained. Teamsters and motorists gave the racer the right of way and from hundreds of persons along the road greetings were shouted to the car as it flew by. The 50 miles were covered in 1 hour and 26 minutes, slightly faster than the regular train schedule. The big car rolled up to the starting point while a hundred enthusiasts cheered the machine and its drivers. Thirty-seven hours had been spent on the road and a full thousand miles had been covered in the great drive.

ENGINEERS MEET FRIDAY

New York, May 18—In accordance with the policy suggested at the meeting of the mechanical branch of the Association of Licensed Automobile Manufacturers in Chicago in December, to the effect that the branch meetings be held at different points throughout the country, in order to give the engineers an opportunity to inspect and study the different factory methods of its members, the next meeting

of the mechanical branch will be held at the Hollenden hotel in Cleveland, Friday, May 22. The morning session will begin at 9 o'clock, taking up the subjects of proposed standard brake and clutch levers which has been given a certain amount of attention by the engineers and especially the test committee for the past 3 or 4 months. A full report of data gathered by the test committee relative to the dynamometer of the Automobile Club of America will be given and discussed. Papers on the two-cycle motor will be read by E. W. Roberts and A. W. Thompson will give an illustrated lecture on the advantages of combination valves, nickel steel heads and carbon steel ends.

CUP RACE ON LONG ISLAND

New York, May 19—Special telegram—The next Vanderbilt cup race will be run on Long Island. This fact became known through press dispatches from Worcester, Mass., telling of the awarding of a contract for the building of a 60-mile stretch of roadway for the Long Island motor parkway to the Hassam Paving Co., the completion of 10 miles of the roadway by October 1 being made a part of the contract. When the bids of Savannah and other cities for the race have come up for discussion Chairman Thompson, of the A. A. A. racing board, invariably has stated it would be the policy of himself and his associates to hold the race near New York, provided that a course either fenced in or guarded by soldiers could be secured. The racing board in announcing the rules for the Vanderbilt race embodied in its bulletin the statement that the date and course would be announced on or before July 1. The chairman now reiterates his statement. It can be safely assumed that adjoining roads will be made use of to enable the employment of whatever straightaway stretch of the Long Island parkway may be available for the race. All statements as to the location of the stretch to be used, the details of its arrangements for racing purposes and the building of loops for making the turns at either end are of necessity at present mere guesswork.

BIG MEET FOR ST. PAUL

St. Paul, Minn., May 18—Having raised a guaranty fund of \$50,000, the St. Paul Automobile Club announces it will hold one of the largest racing meets ever pulled off in the northwest July 15. The races are to be held on the state fair track at Hamline. The first event of the meet will be the attempt of each racing car to break the record for a circular track. The second event will be a three-heat race, 5 miles to the heat, best two out of three. The third event will be a Twin City championship contest, in which three cars from St. Paul and a like number from Minneapolis will enter for a 5-mile race in two heats. The fourth event will be the Briarcliff racers.

ZUST AND DE DION OUT

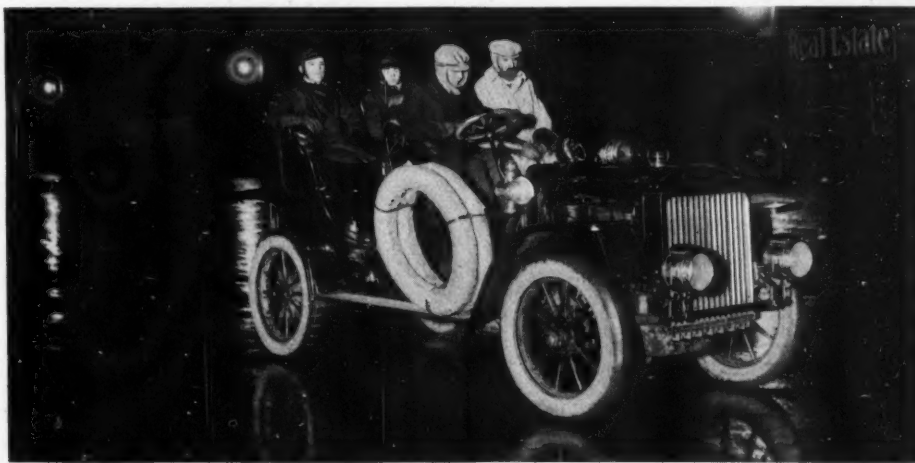
Italian and French Cars Withdrawn From New York-Paris Race—Thomas at Vladivostok

Chicago, May 19—In a roundabout way comes news of the New York-Paris racers, the latest sensation being the announcement that the de Dion and Zust have been withdrawn, leaving the Protos the only one to give the Thomas a race. As the American car has 30 days' allowance over the German it would look as if a victory for the Thomas was assured. This information is contained in a cablegram sent from Paris last Saturday, which says: "The committee in charge of the New York-Paris race received from Milan yesterday official announcement from the Società Motori Zust of the withdrawal of its car from the race at Vladivostok. The Marquis de Dion has also formally withdrawn his car, leaving the American Thomas car and the German Protos car to complete the journey from Vladivostok to

the road across Siberia before Wednesday morning, as there are various matters to arrange before the car can begin its trip. Customs delays will fill the best part of 2 days and the motorists desire to obtain permits to carry firearms and to use the rails of the Trans-Siberian railroad to cross bridges or when the road is impassable. It is expected that the Russian officials will extend both privileges to them, as they have already been instructed to facilitate the passage of the racing cars in every way possible.

"The gasoline supply has been cached between Vladivostok and Irkutsk by the Russian committee through the Nobel Oil Co. and there will be no difficulty on this score. Reports concerning the road conditions are not so satisfactory, however. Heavy rains have prevailed along the route, especially in Manchuria, and the roads are reported to be virtual quagmires in various places. The weather is excellent now, however, and the Americans hope the road conditions will improve steadily under the influence of sun and wind.

"The crew of the racing car has re-



FLASHLIGHT OF START OF WHITE FROM SAN FRANCISCO

Paris. The German car is forced by the regulation of the race committee to allow the Thomas car 30 days in the crossing of Asia and Europe, on account of the action of the German crew in taking a train in America from Pocatello, in Idaho, to Seattle, prior to sailing for Vladivostok. The French and Italian cars have reached Vladivostok and the German and American cars are expected there in a few days. It is understood that the Zust factory at Milan has recalled Giulio Sirtori, who drove the Italian car across the United States, to assist in preparing another car at Milan to enter the contemplated race across the United States this summer."

The arrival of the Thomas at Vladivostok was chronicled Monday in a cablegram from that place which told of the experiences of the Americans as follows: "The Americans reached here this morning after a run across the Sea of Japan on the steamship Mongolia, leaving Tsuruga on Saturday afternoon. It will scarcely be possible for the Thomas car to start on

ceived hundreds of letters and telegrams from Americans at various Japanese and Chinese ports and even as far away as the Philippines, wishing them all success in their contest, and congratulating them on the splendid victories already achieved."

NO SOLAR INJUNCTION

Chicago, May 20—Denial is made and proof furnished that the Rushmore Dynamo Works did not secure an injunction against the Badger Brass Mfg. Co. as stated in the preceding issue of Motor Age. The information was furnished by the Rushmore company and published substantially as received. Since then it is learned that these statements were untrue and that the facts by no means warranted them. It appears that Judge Lacombe did not make the animadversions alleged and did not grant the injunction. It is also true that the Rushmore suit is against the Badger Brass Mfg. Co., of New York, and does not affect the Badger Mfg. Co., of Kenosha, a different corporation.

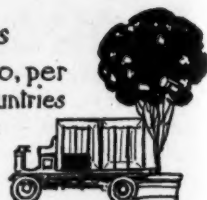


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AN ASPECT OF BRAKING



JAMMED my brakes on and skidded the wheels but could not even then stop soon enough." Herein is summed up the art and science of properly applying brakes on a motor car as practised by scores and hundreds of drivers who are daily entrusted with the operations of motor vehicles. Viewed critically this is poor braking in that it wears out the tires, does not stop the cars so quickly as might have been done without skidding the wheels and racks and strains the car more than the occasion calls for. Good braking is judged from two viewpoints, first the length of time required to bring the car to a stop with the brakes working at their most advantageous condition and second the distance covered by the car before it is finally stopped. A driver in complying with both of these conditions may or may not skid the wheels, in all probability he will not. Skidding of wheels is generally accomplished by a too suddenly gripping brake, one that does its seizing almost instantaneously and which brake may be of little use unless applied in this manner. On the other hand are many brakes of relatively slow application which will bring a car to a standstill quicker than will the wheel-skidding one, but without the skidding of the wheels, the reason being the more gradual application of the brake and the absence of the locking feature which is to be guarded against.

The danger of a wheel-skidding brake is that the instant the wheels begin skidding the car control is impaired and the rear end begins careening from one side to the other, the only control the driver possesses being by virtue of the steering wheels. The quicker and harder a brake grips the sooner will the wheels skid and the sooner is the perfect control of the driver over his machine lost. A less active brake and one, more gradual in application, will start slowing the wheels without skidding them and so long as the wheels are turning and not skidding the driver retains his control over the machine. More accidents have been caused by cars skidding due to too rapid braking followed by dangerous skidding than by skidding when brakes were not applied at all.

On the majority of motor cars it is customary to interconnect the pedal brakes and the clutch so that the application of the brakes releases the clutch, the philosophy of the system being that it is poor policy to have the motor tending to take the car in a forward direction and the

brakes tending to bring it to a standstill: the result being two forces acting in opposite directions. While this is true, many drivers brake most efficiently with the pedal or foot brake without releasing the clutch, the argument being that it is harder to skid the wheels with the clutch engaged than with it disengaged. With the clutch engaged and the motor speed slowed down the motor is also directly acting through the transmission onto the back wheels tending to revolve them slower but not to stop them entirely. This motor phase of braking can be carried still further by cutting out the spark and using the motor compression as a brake, the momentum of the car having to be expended on the brakes as well as in turning the motor over. Compare the absorption of the momentum in this manner with that where the motor is immediately cut free and the brakes are the only members left to do the work and the entire stopping remains to be accomplished by the expanding brake shoes or the clamping bands. The argument has been advanced against cutting out the spark and using the motor compression that there is a danger of not retarding the spark before cutting the current in again and if such were done there would be grave danger of a broken crankshaft or other difficulties. There is good cause for such an argument and it would be up to the intelligence of the driver to look after such a possible, and very probable occurrence.

THE VALUE OF CONTESTS



THE general wave of reliability, endurance, sealed-bonnet and hill-climbing contests, that is sweeping America from east to west during the present months and which gives promise of continuing for the entire season, is proving of great value to the manufacturers and is of particular value to persons contemplating the purchasing of cars. The technical examination of machines at the completion of the tests is further one of the especially valuable features of these contests in that it lets the people know what are the poor features and weak spots of the machines. The value of contests of this nature to makers has been demonstrated very forcibly in the three or four contests of this nature already promoted and the value to them from others to take place within the next few months will be particularly profitable to many.

Although makers and others strongly objected to the eliminating of cars by a technical examination and the evolving of a

winner, there being but one and often not that many with a perfect score; at the present time everybody is coming to realize that the twenty or thirty-perfect-score contest is of little value to anybody and resolves itself into nothing more than an outing for the competitors. At first the argument was advanced that the public on reading only one perfect score in a certain contest would come to the conclusion that cars were being poorly constructed and they would have little confidence in motor vehicles. In other words many makers argued that the public would have so little faith in a car not having a perfect score that they would not buy. Time has shown that there is not a gram of truth in the contention. In the old days—not more than a year ago—when over half the cars came in with perfect scores the public saw the bent front axles, the broken springs, and saw the car by the roadside with the bonnet up; and worse than all the public, and that same public, too, read in the daily and class press that these same cars had perfect scores. After seeing cars in these conditions and reading of their perfect scores what confidence could the public be expected to have in reliability or endurance contests?

Now that the real contests are being put on and that cars are being penalized for broken, lost and injured parts as well as for work done, on the road and time lost in reaching controls and checking stations this same public reads that the cars receiving penalties were receiving them for certain difficulties and their confidences in tests of this nature is being restored. In short the technical examination has prevented the reliability contest from experiencing a quick and certain death.

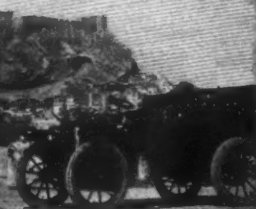
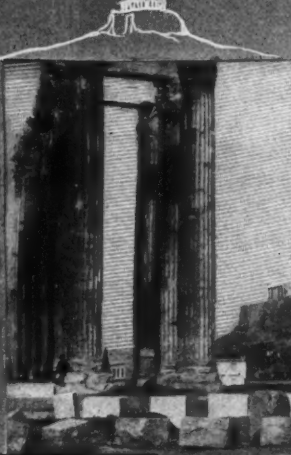
To the maker has come the strong intelligence that his defects are not hid under a bushel. The broken or lost engine part is brought to light, the water or oil leak is discovered and the factory is certain of getting a strict and accurate account of the car's troubles. As a result cars are improved. A maker who finds one part of his car giving trouble in successive contests will immediately attempt to rectify the mischief: the other maker has the weaknesses of his machine brought before the people and doubly impressed on himself, with the direct outcome that succeeding models are big improvements over the old ones.



Past and Present Here Unite



PARTHENON



CHARLES J. GLIDDEN has completed his present trip and is preparing now for his coming to Boston, having taken some lessons in ballooning at Paris a short time ago. The big balloon he ordered constructed has been finished and it will be ready for him on his arrival. Mr. Glidden plans to make an ascension shortly from Pittsfield, Mass., when he will have a number of well known people as his guests. Almost 1,000 miles was covered by the Gliddens during their stay in Greece, which was terminated on April 16. Their pilgrimage in that land of classical lore was made from Piraeus, around Athens to the plain of Marathon, to Tatoi, Thebes, Eleusis, Delphi, Nauplia, Mycenae, Tyrins, Epidauros, Corinth, and minor points famous in times



MARATHON HILL



STOA OF ATTALOS

long past. Greece has many attractions for the motorist, although the roads are somewhat limited, and generally bad, but well graded—of course, the scenery is superb to the antiquarian. There are about thirty cars in Greece at the present time, mostly in Athens, and gasoline costs 60 cents a gallon—a serious handicap. Mr. and Mrs. Glidden arrived in Paris May 10, after a tour of 3,831 miles in Egypt, Syria, Greece, Italy and France. They have now completed 46,123 miles of their 50,000-mile tour, and have been in 14,000 towns. The next trip will comprise Algeria, Tunis, Norway, Russia and Cuba.

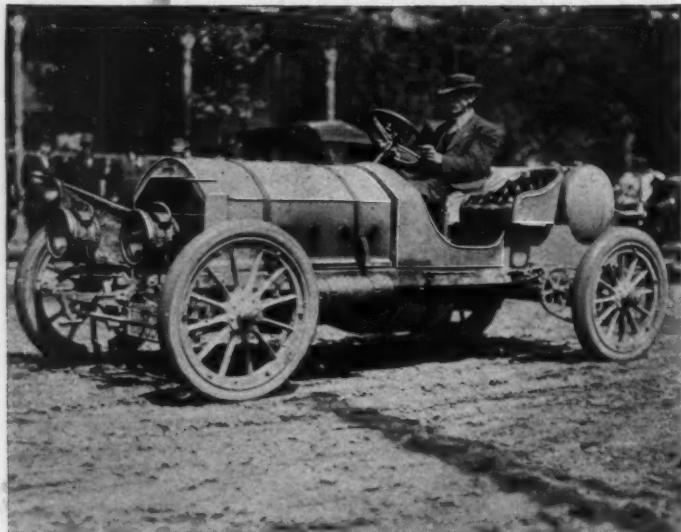


THEATRE HERODES ATTICUS

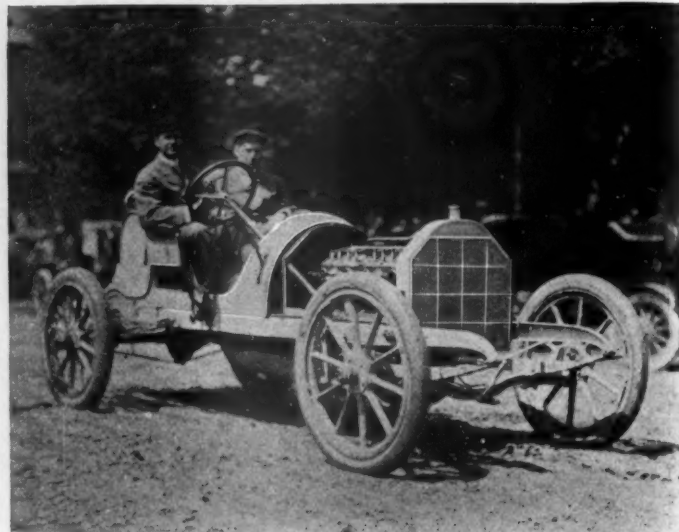


THE PARTHENON

BAD WEATHER MARS CHICAGO HILL-CLIMB



EDGAR APPERSON IN "BIG DICK" AT ALGONQUIN



C. A. TILT'S SPEEDY DIAMOND T

CHICAGO, May 19—It isn't the fault of the Chicago Motor Club that the third annual hill-climb at Algonquin is not a matter of history, for three times has the local organization tried to hold the event since last Friday, for which time it was originally scheduled. But each time the weather was so bad or the roads in such poor condition that it was necessary to postpone the affair and now it will be August 14 before the classic again appears upon the local calendar. On one of the days the club was partially successful in that it ran off the motor cycle events, two complete classes of the car climbs and part of another. But this was only on Perry hill, which constitutes just half the regular climb. This fragment, however, was most satisfactory, for it showed that this year's crop of cars is capable of altering the Algonquin record sheet; in fact the best time in each of the classes yesterday was faster than in the previous years, while a new mark was put up for the whole field to shoot at—:25% in comparison with the :26%, which was established last year.

Originally the climb was set for last Friday, but for several days preceding it had rained and on Thursday morning, when a particularly smart dash of rain hit Chicago, the contest committee got in touch with Algonquin, found the hills were in poor shape and slid over the card until Saturday. This was disappointing, of course, but the small army of contestants swallowed its disappointment and laid over. Friday evening was a beautiful night—just like mid-summer, bright moon, twinkling stars and all that, and even the oldest inhabitant could not see how it possibly could rain. But it did, and the contest committee jumped at conclusions and hastily set the affair for Monday. Half an hour after the announcement of this decision the sun came out, the course dried up and the afternoon was a glorious one. Unfortunately, however, the contestants were not prepared for this unexpected treat and could not take advantage of the opportunity because some of them had gone back to Chicago by train. Sunday was another beautiful day and those who had gone visiting returned to Algonquin that night expecting the treat of their lives yesterday.

It was a gloomy morning, though, but just that kind of a day when you have a hunch it isn't going to rain, and so the contest committee hustled around and prepared to at least finish one hill before another postponement was necessary. Had it not been for some mischief-maker it is possible this might have been achieved. The Trego timing apparatus was responsible. The motor cyclists, who had been put on for the curtain-raiser, were ready at 9 o'clock and Chairman Root had taken time by the forelock and started the two-wheelers half an hour ahead of schedule. The first man went up a-whizzing and was promptly clocked by the clever

little device. The next one came up and the clock did not work. Another was tried with the same lack of success, then it was discovered the cable had been short-circuited in some manner—probably by some mischievous person sticking a pin into the cable. It took nearly an hour to solve the problem, during which time the skies had darkened and rain threatened any minute. But it held off and the motor buggies tackled the hill. Six of them went up in a most dignified manner and the officials hoped for the best. The timer was working like a clock, as they say in the story books, and it seemed likely the morning climb would be completed. The four-cylinder Bendix was fastest, doing :46%, but the No. 5 Kiblinger led in percentage in this class.

In between classes A and B the crowd got its only touch of excitement. G. F. Sulzberger, the millionaire packer who was an entrant in the amateur championship, was allowed to have his shy at the hill in order that he might strip his car for the free-for-all, the star event of the day, supposedly. Sulzberger fairly burned up the

MOTOR CARS ON PERRY HILL

CLASS A, MOTOR BUGGIES		
Car.	Time.	Pct.
Bendix	:46 2/5	3.72
Holsman	:56 1/2	3.90
Kiblinger	1:05 2/5	4.13
Black	1:31 1/5	6.33
Kiblinger	1:01 1/5	3.53
Holsman	1:39 1/5	6.68
CLASS B, UNDER 50 INCHES		
Buick	:52 2/5	4.24
Maxwell	1:02 2/5	4.72
Jackson	1:19 4/5	5.85
Moline	:37 2/5	3.72
Overland	:55 4/5	4.59
Waltham-Orient	1:11 2/5	3.44
Auburn	:54 1/2	4.61
Buick	1:18 2/5	4.65
Jackson	:43 2/5	4.17
Brush	1:27 4/5	2.96
CLASS C, OVER 50 AND UNDER 65 INCHES		
Haynes	:39 3/5	3.88
Wayne	:36 4/5	4.33
Moline	:32 2/5	3.86

MOTOR CYCLES ON PERRY HILL

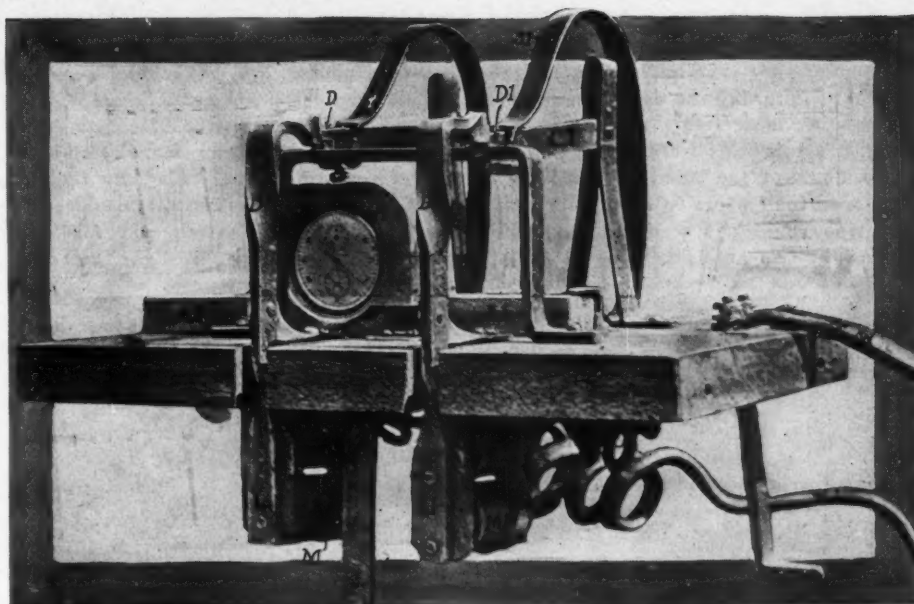
20.10 CUBIC INCHES DISPLACEMENT		
Name and machine.	Time.	Pct.
G. S. Hincley, Thor.....	:42 3/5	2.45
30.50 CUBIC INCHES DISPLACEMENT		
Howard Holck, Thor.....	:38	2.52
J. S. Tormey, Indian.....	:36 1/5	3.10
W. H. Vallois, Armac.....	:37 4/5	3.14
H. T. Adams, Excelsior.....	:43 1/5	3.56
J. A. Turner, Merkel.....	:47	4.44
50.10 CUBIC INCHES DISPLACEMENT		
Howard Holck, Thor.....	:36	2.39
W. H. Vallois, Armac.....	:36 4/5	3.13
J. T. Fisher, Indian.....	:28	3.23
J. S. Tormey, Indian.....	:28 4/5	3.04
J. A. Turner, Merkel.....		Disqualified
FREE FOR ALL, ONLY TIME COUNTING		
	Time	
J. S. Tormey, Indian.....	:28	
J. T. Fisher, Indian.....	:28 2/5	
Harney Bernard, Harley-Davidson.....	:32	
J. A. Turner, Merkel.....	:34	
Adelard Mercil, Armac.....	:34 1/5	
W. H. Vallois, Armac.....	:37	

hill in his effort. His big Stearns six made light of the task set before it—the 10 per cent grade looked like a level street to it, evidently, and it whizzed around the bends and broke the string in :25%, whereas the old record was :26½, made last year by Leland also in a Stearns.

Their appetites whetted by this exhibition of speed, the spectators settled back to watch the class B cars buck the grade and they were well repaid, for the comparatively little cars—the class was for cars with a piston area under 50 square inches—really distinguished themselves. The fastest of the bunch was one of the new Molines—a 24-horsepower rig and the most powerful of the lot—which scrambled up in :37%, a slash of ½ second off the Jackson mark in the same class 2 years ago. In the percentage figures, however, the honors went to the little Brush runabout, which, while its time was only 1:27%, had the advantage of a diminutive cylinder capacity which gave it the edge in the handicap and figured it the leader of the class.

Three of the class C cars climbed before the weather man got nasty again. The Haynes, star in this class last year, went up in :39%, but the Wayne skinned it in point of time by doing :36%. Then came the second barrel of the Moline gun, the car from down state, a 26.4-horsepower roadster, digging its toes into the dirt and negotiating the standing start grade in :32½, which beats the :36½ of the Stoddard-Dayton 2 years ago when the cars were classified by price instead of cylinder capacity. As a matter of fact it also was faster than the :38 of the Haynes in the class above last year.

Yesterday while the Haynes had been going up it had started to sprinkle. It rained when the Wayne shot to the top and it poured when the Moline slipped, skidded and struggled up. Announcer Temme roared through the megaphone to the effect that all bets were off and the crowd broke for shelter. The remaining cars in the contest were still at the bot-



TIMING APPARATUS, DESIGNED BY F. H. TREGO, USED AT ALGONQUIN

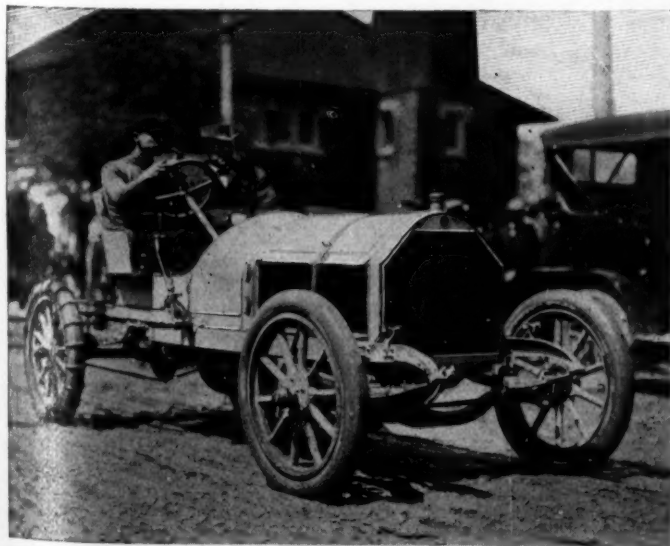
tom of the hill, blocking the only road to town, so one can imagine the confusion. Big cars slid into the ditch and their wheels buzzed around in a vain effort to get traction. The pedestrians needed tire chains themselves, so altogether it was a wet and weary struggle back to the little village, where a disgusted lot of hill-climbers gathered at the Morton house and waited for the oracle of the contest committee to give utterance. Finally it came in the announcement that drivers of the contesting cars were to hold them in readiness to climb at an hour's notice; that if it was impossible to continue that afternoon that another attempt would be made today. Failing in this, the whole affair was to go over until August 14, when the weather will be more settled.

Upon the issuing of this edict there was a general scattering. Everybody knew down in their hearts there wasn't a chance of running the climb today, and some of them did not even wait to see. Walter White packed his two steamers into their

special car and gave orders to ship to Cincinnati, while several others, notably the Jackson, Oldsmobile and Maxwell outfits, hit the trail back to Chicago. Others threatened to go today and all through the town there was a general packing up.

One knew before 12 o'clock last night there was no chance, but as a matter of form and because there wasn't any train out of town, the officials stuck until morning. Then Root threw up the sponge, wrapped up his clean collar and led the way to the railroad station. The poor drivers who had to get their cars back to town some way, prepared for a mud plug; the technical committee packed up the flags and other paraphernalia and by noon the town of Algonquin had settled back for its 3 months' nap.

Few regret the experience, though. The townspeople were hospitality personified. Mayor Callahan worked harder to make the way smooth for the motor club than he did at the last election. The chief of police forgot every ordinance in the book



LORIMER IN THE THOMAS-DETROIT "SNOW BIRD"



AT ALGONQUIN—FRANK NUTT AND THE HAYNES TOURING CAR

so far as they pertained to motorists and everyone enjoyed himself. As an example of the hospitality it is told that after the big rain of Saturday the mayor loaned his best pair of trousers to a newspaper man who didn't bring his wardrobe with him. The residents of the beautiful little town threw open their doors to the visitors and those who could not secure accommodations at the two hotels were cared for in

attempted climb was the success that attended the special electrical timer, invented and manufactured by Frank Trego, of the Chicago Apperson agency, which timing system is absolutely electrical, the stop watches being pressed by means of an electric current which is "made" by the car striking wires or strings stretched across the road at the starting and finishing points. An illustration shows how the



WALTER WHITE AWAITING HIS TURN AT THE ALGONQUIN HILL

private families. There was no such a thing as a speed limit on the books and if every horse in that vicinity is not motor-broke by this time it is not the fault of those who had the cut-out habit.

In marked contrast to this hospitable treatment was the action of the authorities at Melrose Park, a suburb of Chicago, where a speed trap was inaugurated and some fifty unlucky wights nailed going to Algonquin, the Melrose Parkers insisting on 10 miles an hour and pinching even the Premier press car which just shaded this the veriest fraction. The motor club intends fighting the cases when they come up in court. Yesterday the White company stationed a picket at Melrose Park and so well did he warn everyone that no one was arrested. He was a most unpopular person in Melrose Park, though, the peasantry taking away his flag and threatening him with bodily injury.

A consultation of the contest committee today resulted in a decision to refuse to reopen the entry list. The eighty original aspirants for hill-climbing honors will have a monopoly on the August event. In addition they will be allowed to substitute different models if they so wish and to go in different classes if the changes warrant it. The cars that competed yesterday will have to run up Perry hill again and the records made will not be allowed to stand—in other words, everyone will start fresh on August 14. No advertising of these records or results will be permitted under penalty of being barred by the Chicago Motor Club from the August climb.

Not the least important phase of the

stop-watch is worked. A is a wood casing for carrying the stop watch, the casing being mounted on a miniature sill piece A1, which can be slid on the platform E of the timer. The method of pressing the stop watch button is briefly as follows: For starting the watch is moved in its framework A until in the position D1 when the watch's press button is directly under the end of the lever C1. This lever rests upon a small catch or lip on the curved top of the pivoted lever B1, which lip prevents the curved spring S1 from pressing the lever C1 upon the watch button and so starting the watch. Beneath the platform E is an electro-magnet M1; and on the lower end of the lever B1 is a soft iron

piece which is attracted as soon as the electric current is allowed to enter the electro-magnet M1. When this occurs the end L1 of the lever B1 is drawn toward the electro-magnet, the top end of the lever B1 is pulled out, permitting the arm C1 to slip off the lip or catch on the curved head of B1 and the press button of the watch is forced down, starting the watch. The only point not herein explained is how the electric current is allowed to enter the electro-magnet M1, which is down by means of the wire or string across the road at the starting point. As soon as the front wheels of the car strike the wire or string, one end of which is attached to a wooden plug holding a spring switch open, the string is pulled, withdrawing the plug and making or completing the circuit, thereby allowing the current to pass through the electro-magnet M1. This completes the starting part of the device.

Immediately the watch is started the timer at the top of the hill on the finishing line slides the casing A with the watch to the position D so that the press button of the watch is directly under the end of the lever C which is held up by a lip on the curved end of the lever B. When the car wheels strike the wire or string across the road at the finishing line another separate electric circuit is completed, allowing the current to enter an electro-magnet M and the operation that occurred at the starting line is repeated. Mr. Trego has presented the apparatus to the motor club.

BIG FIELD IN HOOSIER TEST

Indianapolis, Ind., May 20.—At 7 o'clock in the morning thirty-seven cars left University park, the start, in the first sealed bonnet contest held under the auspices of the Indianapolis Automobile Trade Association. The entries are divided into three classes, as follows: Class A—1907 or 1908 stock touring cars, runabouts or roadsters, catalogued at \$2,500 or over; class B, 1907 or 1908 stock touring cars, runabouts or roadsters, catalogued at \$1,500 up to \$2,500; class C, 1907 or 1908 stock touring cars, runabouts or



J. T. FISHER ON INDIAN MOTOR CYCLE AWAITS THE GUN AT ALGONQUIN

roadsters, catalogued under \$1,500. Under the rules all cars must carry throughout the entire run the catalog equipment of fittings, lamps, horn, body, etc. Each car must also carry besides the driver and observer, enough persons to make up the full passenger load, and each passenger is required to weigh 125 pounds. The entrant, if he desires, can carry the equivalent in ballast. During the run the cars will be checked twice, probably at Westfield and Newcastle and the average speed will be as follows: Class A, an average of 18 miles per hour; class B, an average of 16 miles an hour, and class C, an average of 14 miles an hour. A confetti car will precede the contestants. Each time a seal is broken or access gained to the part of which seal is broken a penalty of 25 points will be incurred. A similar penalty will be incurred for adjusting or replacing the brake, clutch or universal joint, which cannot be sealed. Leaving the city the cars went to Westfield and the route will include Noblesville, Pendleton, Anderson, Muncie, Newcastle and Dunrieth, returning to this city from the latter place.

The committee arranging the contest consisted of Frank Staley, of the H. T. Hearsey Vehicle Co.; Frank Moore, of the Fisher Auto Co.; George Weidley, of the Premier Motor Mfg. Co.; A. E. Vinton, of the G & J Tire Co.; P. D. Stubbs, of the Overland Auto Co., and Paul Smith, of the Indianapolis Motor Car Co. George Weidley, of the Premier Motor Mfg. Co.; Howard Marmon, of the Nordyke & Marmon Co., and W. G. Wall, of the National Motor Vehicle Co., comprise the technical committee. The entries and drivers:

Class A, listing at \$2,500 and over—Marmon, Nordyke & Marmon Co., W. C. Marmon; Marmon, Nordyke & Marmon Co., H. C. Shaffer; Marmon, Nordyke & Marmon Co., W. Clark; Marmon, Nordyke & Marmon Co., Richard Wiley; National, Fisher Auto Co., John Aitken; National, Fisher Auto Co., Thomas Kincaid; National, Fisher Auto Co., W. F. Strebe; National, Fisher Auto Co., Harry Moore; White, H. T. Hearsey Vehicle Co., John W. Bell; Premier, Premier Motor Mfg. Co., W. Brown; Premier, Premier Motor Mfg. Co., Harry Hammond; Premier, Premier Motor Mfg. Co., Cliff Waltman; Haynes, W. W. Reagan; Loring Wagoner; Premier, Premier Motor Mfg. Co., Newell Molsinger.

Class B, \$1,500 to \$2,500—Maxwell, Fisher

Auto Co., Miner E. Haywood; Maxwell, Fisher Auto Co., J. A. Newby; Rambler, H. T. Hearsey Vehicle Co., Edward Collier; Rapid, Indianapolis Motor Car Co., Frank Crogan; Lambert, Sullivan Auto Co., Harry Stodgell; Lambert, Sullivan Auto Co., Ray Lewis; Marlon, Gibson Auto Co., Geo. Hedlam; Marlon, Gibson Auto Co., J. F. Menthorn.

Class C, under \$1,500—Maxwell, Fisher Auto Co., Donald Herr; Mitchell, Fisher Auto Co., Bert Corbet; Maxwell, Fisher Auto Co., C. W. Kelsey; Maxwell, Fisher Auto Co., O. J. Gronendyke; Overland, H. T. Hearsey Vehicle Co., Carl Baumhofer; Overland, H. T. Hearsey Vehicle Co., Carl Brockway;

3 hours 34 minutes. The course, which was triangular in shape, with Wilmington, Kennett Square and West Chester at the three corners, was in poor shape, the roads being muddy and heavy as a result of the heavy rains of Friday.

BUSY TIME FOR QUAKERS

Philadelphia, Pa., May 18—The sporting Quaker motorist just now is prepar-



SULZBERGER JUST BEFORE STARTING HIS RECORD CLIMB AT ALGONQUIN

Auburn, Finch & Freeman, W. W. Beeson; Richmond, Finch & Freeman, T. K. McCune; Hassler, Robert H. Hassler, R. H. Hassler; Reo, Gibson Auto Co., Cecil E. Gibson; Cartercar, Indianapolis Auto Co., C. C. Himes; Cartercar, Indianapolis Auto Co., W. A. Carr; Cartercar, Indianapolis Auto Co., C. S. Hicks; Cadillac, Cadillac Auto Co., G. H. Graves.

ROADABILITY TEST HELD

Wilmington, Del., May 16—Today's roadability contest of the Delaware Automobile Association resulted in a win for Frank L. Connable, who drove his Franklin touring car over the 45-mile course in 3 hours 29 minutes—the exact time settled upon by the contest committee. H. S. Lane, in a Thomas runabout, was second, in 3 hours 28 minutes, and Robert S. Glover, in a Maxwell touring car third in

ing for a strenuous campaign on road, track and beach. First to attract his attention will be the Wilkes-Barre Giant's Despair climb on May 30. This event is always so well patronized by Philadelphians that the committee has found it advisable to include in its program an event open only to members of the Quaker City Motor Club. Then follows the Williamsport Automobile Club's climb on the Villamont mountain drive a week later, June 6. The following Saturday, June 13, the Quaker City Motor Club will inaugurate its track-racing season with an eight-event meet at Point Breeze track. The following week will be blank, barring the annual orphans' day stunt, underlined for Wednesday. On Wednesday, the 24th, begins the 4-day carnival of the Monroe County Automobile Association, including an endurance run, hill-climb, short-distance races and gymkhana. Those who cannot leave town for such a length of time will have an opportunity of satisfying their sporting proclivities at the hill-climb of the Norristown Automobile Club, which is scheduled for Saturday, June 27. The following Saturday, July 4, the Motor Club of Wildwood, N. J., will have its annual short-distance race carnival, either on the beach or over the greatly-improved and lengthened Central avenue boulevard. There are rumors of things doing along the same line in July and August, although no dates have as yet been announced. Altogether the coming summer promises to be a very busy one for the motorists in and around the Quaker City.



TIMING APPARATUS AND TELEPHONE AT BOTTOM OF PERRY HILL, ALGONQUIN

GOOD WORK IN KANSAS RELIABILITY RUN

KANSAS CITY, Mo., May 16.—With a schedule faster than the Glidden tour; with seven controls, which made consistent running a necessity, seventeen of twenty-eight starters finished the Kansas City Automobile Club's second endurance run with perfect scores. The scoring was on the basis of 100 for perfect. Except for the replenishment of tanks, the 145-mile jaunt was practically a sealed bonnet contest, for every adjustment was penalized. Tire troubles were not charged unless the engine was stopped during repairs. In the latter event one point was charged against the contestant for each minute or fraction thereof the motor was dead.

The controls were spaced irregularly, so as not to give advantage to the late car, running fast to make up time. The first control was Zarah, Kan., 16.5 miles from the start; the second, DeSoto, Kan., 26.5 miles; the third, Lawrence, Kan., 44.5 miles; the fourth, Baldwin, Kan., 60 miles; the fifth, and the noon stop for 80 minutes, Ottawa, Kan., 75.3 miles; the sixth, Edgerton, Kan., 99 miles; the seventh, Olathe, Kan., 117.5 miles; the last, Kansas City. Altogether it made a good run.

At 7:30 in the morning the cars got away from Armour boulevard and the Paseo, with thirty or forty club members who did not participate in the run as escort. The sun shone brightly all day and the roads, which were a little rough in spots, became good as soon as three or four cars had passed over them. The running time called for the first car to finish at 4:55 p. m., the others, 2 minutes apart, following.

Those cars that finished perfectly ran well from the start and a majority of them got no attention during the long tour, not even as to tires. There was some loafing

outside the controls, but this feature was minimized by the irregular spacing of the red flags and the necessity for keeping the motor running. This made an unusual feature and kept every one guessing.

M. C. Albertson's big Royal Tourist ran into a crowd at Baldwin and laid two men on their backs. Fortunately their injuries were slight. The car was rapidly rounding a turn in the town in order to reach the control. The crowd was hidden on the other side of a building and not seen in time by the driver who dashed into the unch.

That a dealer with a good mechanic, perhaps supplemented by a driver, can go through a run like this in better shape than a private owner was pretty well proved. All but eight of the twenty-eight starters were in the trade and of these eight three more might be ruled out if the strict ownership line was drawn. Of the eight four finished perfect and four did not finish within the allotted time. This would make 50 per cent of the private cars finishing perfect, while the dealers, with thirteen out of twenty perfect, showed 65 per cent. Should the lines be drawn strictly the results would show two owners out of six perfect and fifteen dealers out of twenty-two perfect, so the amateurs did good work.

When the route was laid out there were apportioned only three cups as prizes on the theory that the event would prove too difficult for most of the cars. As it, however, largely by reason of the high class of cars entered, resolved itself more into a tour, it is possible that the successful cars will have to run off the tie. A decision on this point will be made by the runs and tours committee on the course of a few days. However, it is probably

some way of avoiding a run-over will be devised, which is to be desired.

Throughout the tour the friendliest of feeling was displayed toward the tourists. Whole towns took a holiday and there was nothing in that rich country of western Missouri and eastern Kansas that was too good for the motorists. To say that they appreciated this and did everything possible to reciprocate is only fair to say of the country people.

Penalties were imposed as follows and points deducted from a clean score of 100 at start: For adjustments, 1 point; for repairs, 2 points; for replacements, 3 points; for stopping motor outside of control, even during tire repairs, 1 point for each minute; for repairs assisted in by anyone but driver and mechanic, 10 points. The penalties were:

No. 3—The clutch on this Corbin had to be adjusted twice. Once the engine was killed and 2 points were lost on time.

No. 19—This Franklin came near being penalized for the absence of a tail lamp, but the committee decided later not to penalize.

No. 20—The Studebaker observer's report was such that it will have to be explained to the committee. Reading it one way, the car might be penalized 15 points, or, again, the penalty might run as high as 46 points. If this latter score is correct, the standing would be 54, practically all of it due to time motor was stopped and tires were being repaired.

No. 21—Pennsylvania's low gear locked. The discovery was made on the road and the examination of the gear case charged as an adjustment.

No. 22 or 32—The Stoddard-Dayton started without spare tires and lost enough time on this item to put the car out of the running.

No. 27—The Mitchell had spark plug trouble and was charged 3 points for the replacement.

No. 29—The Stanley steam runabout returned from Lawrence by mistake, instead of going through the entire run. This car was not checked in at the finish.

No. 33—Pennsylvania lost 9 points, all on time. Five points were charged for late start and the rest of the time was lost on controls. A train held up this car 4 minutes at one place.

No. 34—The Knox lost 5 points for a late start and 1 for being late at control.

CONTESTANTS IN SECOND ANNUAL RELIABILITY RUN OF THE KANSAS CITY AUTOMOBILE CLUB

No.	Name of car	H. P.	Car model	Entrant	Driver	Score	Notes
1	White runabout	30	1908 K	H. E. Rooklidge	H. E. Rooklidge	100	
2	Maxwell	30	1908 D	W. S. Hathaway	Charles Levendoske	100	
3	Corbin	30	1908 K	Herman Peltzer	Herman Peltzer	95	Clutch trouble
4	Studebaker	30		W. L. Walls			Did not start
5	Thomas	40	1908 Detroit	R. C. Greenlease	R. C. Greenlease	100	
6	Reo roadster	30		C. V. Mayhugh	C. V. Mayhugh		Did not finish
7	Royal Tourist	45	Special	M. C. Albertson	M. C. Albertson	100	
8	Stevens-Duryea	35	1908 U	M. C. Nolan	M. C. Nolan	100	
9	Packard	30	1908	P. T. Campbell	P. T. Campbell		Did not start
10	Maxwell	24	1908 D	Elliott H. Jones	E. H. Jones		Did not finish
11	Oldsmobile	36	1908	Carl J. Simons	C. J. Simons	100	
12	Packard	30	1908	E. P. Moriarity	E. P. Moriarity	100	
13	Pope-Hartford	30	1908 M	H. Holzhauser	H. Holzhauser	100	
14	Pierce	40	Great Arrow Six	Carl J. Simons	F. S. Day	100	
15	Studebaker	30	1908 A	W. L. Walls	Wm. Goodrich	100	
16	Started as No. 33						Penalized 5 points; late
17	Corbin	30	1908 K	Fletcher Cowherd, Jr.	F. Cowherd, Jr.	100	
18	Stanley	30		G. W. Cunningham			Did not start
19	Franklin	42	1908 H	S. B. Bell, Jr.	J. G. Sheldon	100	
20	Studebaker	30	1907 A	W. L. Walls	W. L. Walls		Faulty report
21	Pennsylvania	50	1908 C	Gordon Beaham	G. Beaham	99	Low gear locked
22	Started as No. 32						Penalized 5 points; late
23	Premier	24	1907 Touring	W. W. Cowen	E. S. Cowen	100	
24	Stanley	20	1908 F	F. R. Sanborn	F. R. Sanborn	100	
25	Peerless	50	1908 20	D. B. Munger	D. B. Munger	100	
26	Stevens-Duryea	35	1908 U	J. F. D. Moriarity	J. F. D. Moriarity	100	
27	Mitchell	35	1908 I	Nelson Haynes	C. F. Dinklage	97	Broken spark plug
28	White	20	1908 L	H. E. Rooklidge	Geo. M. Gilson	100	
29	Stanley	10	1908 EX	Fletcher Cowherd, Jr.	Edmond Follensby		Did not go full course
30	Stevens-Duryea	35	1908 U	E. F. Webster			Did not start
32	Stoddard-Dayton	30	1907 K	C. F. Mensing	C. F. Mensing		Did not finish
33	Pennsylvania	50	1908 C	R. V. Jones	F. E. Foulke	91	Late at controls
34	Knox	30	1908 L	G. W. Bonney	G. W. Bonney	94	
35	Reo	20	1908 Touring	H. E. Rooklidge	Wilkins Taylor		Did not finish

Note—No. 35 was entered in class B but changed to class A as there were no other B contestants; 100 denotes perfect score.

TEST ONE OF RELIABILITY AND ECONOMY

HARTFORD, CONN., May 18—Of the forty-seven cars that participated in the 174-mile reliability run of the Automobile Club of Hartford Saturday eighteen returned perfect scores, the affair proving a huge success. It was novel in that combined with the usual reliability features a fuel test in which those who wished could compete. Twenty-eight took advantage of this opportunity and while the Ford, winner in the small class, has been protested by the Mitchell, this angle of the competition proved most interesting. The big class honors, that is, for cars costing above \$3,000, went to the Stevens light six driven by Pete Robinson. For cars costing between \$1,500 and \$3,000, the Knox sportabout won. For cars selling at less than \$1,500 the honors went to Louis Elmer and the Ford runabout. The Stevens six used 11 gallons and two quarts, the Knox 8½ gallons, and the Ford 9 gallons, 2½ quarts.

The G. K. Dustin observer's cup, awarded by G. K. Dustin, secretary of the club, for the car which in the opinion of the observers made the most consistent performance went to the two-cylinder Maxwell driven by J. M. Macdonald. The award of the bronze trophy given by Albert M. Kohn of the house committee,

will be decided at a later gathering of the contest committee.

The perfect score record shows that the eighteen cars which had clean records were as follows: Two Corbins, both Stevens-Duryea sixes, two Ramblers, Stoddard-Dayton, Ford six, No. 22 Mitchell, which had been disqualified and continued under protest; Thomas-Detroit, Packard, Pierce Arrow six, Thomas Flyer, three Maxwells, Knox, and a Buick.

One thing is most apparent, and that is the people of Connecticut believe in motorizing contests as was evident from the vast throngs that lined the course. Many packed cars were in evidence along the route and the people of the various suburban towns were most hospitable. In many instances where a driver had tire trouble some ruralite proffered assistance and while he probably would know more about a mowing machine than a motor tire, yet the spirit was there and in the right place. These good people swarmed along the course and even the school children were in evidence, waving the national colors. Some of them were not aware that the contest was not for speed and endeavored to induce the drivers to hit it up a bit and make a race of it. Few showed any disposition to take the hint.

After all the cars had been started the committee proceeded to put things in readiness for the return of the participants to the Hartford control. Word was received soon that the Reo had stripped a gear, and telephone reports from other controls showed that all was well. G. W. Bennett in the White steamer arrived at Middletown control a little ahead of time and was disqualified. Just as he was about to cross the line after one lap in the Franklin, exactly on time, R. R. Ashwell rounded the corner and blew out a tire. It took 8 minutes to repair it and 8 points were set against the car, which was the only trouble encountered throughout the entire trip. No. 2, the Corbin runabout, used Energine instead of gasoline and for some reason trouble was encountered in that the tank had to be emptied and cleaned out. Tire troubles also worked hard against the car. No. 4, the Ford runabout, had 1 point penalty. The No. 7 Stoddard-Dayton incurred 4 points' penalty at Southington. No. 12, a water-cooled Knox had tire troubles and was taxed 12 points, and No. 13 Buick for fixing a faulty spark plug was penalized 2 points. The Compound came to grief after the Middletown control. The Overland had tire troubles and a leaky radiator

TABULATED RESULTS IN HARTFORD'S COMBINED RELIABILITY AND FUEL ECONOMY TEST

No.	Name of car	H. P.	Cyl. Piston bore stroke	Car model	Entrant	Driver	Gas cons'ption Gal. Qt.	Pt.	Penalty
1	Franklin	20	4 1/4 4	D	R. R. Ashwell	R. R. Ashwell	13	3	0
2	Corbin	28-30	4 1/2 4 1/4	Runabout	Philip Corbin, Jr.	Philip Corbin, Jr.	12	3	0
3	Corbin	30	4 1/2 4 1/4	O	Corbin Motor Veh. Co.	Joe Matson	9	2 1/2	0
4	Ford	18	3 3/4 3 3/8	S	Elmer Auto. Co.	Louis Elmer	11	2	0
5	Stevens Light Six	30	3 3/8 4 3/4	M	Stevens-Duryea Co.	Pete Robinson	12	0	0
6	Reo	18	4 3/4 6	C	Conn. Steel and Wire Co.	R. L. Lockwood	12	0	0
7	Stoddard-Dayton	15	3 3/8 3 3/4	SH	Harry Tuttle	Harry Tuttle	16	3	1 1/2
8	Rambler	32	4 1/2 4 1/2	34 A	Thomas B. Jeffery Co.	V. A. Charles	21	0	1
10	Rambler	40	4 1/2 4 1/2	245 Rdstr.	F. E. Bowers	F. E. Bowers	15	2 1/2	0
11	Rambler	32	4 1/2 4 1/2	34 A	H. M. Turrell	H. M. Turrell	15	0	0
12	Knox	30	4 3/8 4 3/4	L	Miner Garage Co.	S. A. Miner	11	2 1/2	0
13	Buick	22	4 1/2 5	G	Miner Garage Co.	Robert Miner	14	1	0
14	Compound	16-20	4 4	M	Compound M. C. Co.	A. E. Lazarro, Jr.	21	0	0
15	Stoddard-Dayton	35	4 3/8 5	8 F	Conn. Steel and Wire Co.	C. M. Wright	11	2	0
16	Thomas Flyer	48	5 1/2 5 1/2	F	Palace Auto. Station	F. W. Dart	11	1	0
17	Overland	22	3 1/2 4 1/2	24	A. W. Peard	A. W. Peard	11	2	0
18	Thomas runabout	48	5 1/2 5 1/2	F	E. D. Seymour	E. D. Seymour	11	1	0
19	Stevens Light Six	30	3 3/8 4 3/4	M	Stevens-Duryea Co.	S. H. Hancock	17	2	0
20	White	30	...	K	G. W. Bennett	G. W. Bennett	12	2	0
21	Ford Six	40	4 1/2 4 1/4	K	Elmer Auto. Co.	Frank Dunnell	12	2	0
22	Mitchell	35	4 1/2 5	I	Cap. City Auto. Co.	B. F. Smith	15	0	0
23	Rambler	32	4 1/2 4 1/4	34 A	Rambler Agy., New Haven	S. E. Campbell	15	0	0
24	White	30	...	K	Hal. K. Sheridan	Hal. K. Sheridan	15	0	0
25	Pope-Hartford	30	4 1/8 5 1/2	M	D. J. Post	Harold Greene	13	0	0
26	Cadillac	30	4 1/2 4 1/2	M	A. Mitchelson	A. Mitchelson	13	0	0
27	Peerless	40	4 3/8 5 1/2	18	A. E. Bradley	Dean Rankin	11	2	1 1/2
28	Oldsmobile	36	4 3/8 4 3/4	M	C. P. Hulst	C. P. Hulst	11	2	1 1/2
29	Pope-Hartford	30	4 1/8 5 1/8	M	T. F. Garvan	T. F. Garvan	15	3	-0
31	Corbin	24	...	T	Corbin M. V. Corp.	J. F. Corbett	10	1	1 1/2
32	Knox	30	4 3/8 4 3/4	H	Miner Garage Co.	J. W. Lynch	11	0	0
33	Corbin	30	4 1/2 4 3/4	S	Stanley Goss	Stanley Goss	11	0	0
34	Columbia	29	4 1/2 4 1/2	48-2	C. D. Alton, Jr.	John Coffey	14	3	0
35	Thomas-Detroit	40	5 4 3/4	"30"	Palace Auto. Station	Oliver Light	11	0	0
36	Packard	30	5 5 1/2	S	J. B. Burrall	J. B. Burrall	14	3	0
37	Cadillac	10	5 5	S	Brown-Thomson Co.	John Leltz	24	1	1 1/2
38	Pierce Arrow	40	4 1/4 4 3/8	Runabout	W. H. Hall	Deforest C. Lull	8	2	0
39	Maxwell	24	4 1/2 4 1/2	D	A. B. Barkman	A. B. Barkman	14	0	0
40	Thomas Flyer	48	5 1/2 5 1/2	Flyer	Hartford Rubber Works	J. D. Anderson	17	0	0
41	Atlas	40	4 1/2 4 1/2	Runabout	Atlas M. C. Co.	F. W. Ruggles	14	0	0
42	Knox	30	4 3/8 4 3/4	Sportabout	Knox M. C. Co.	William Bevor	17	0	0
43	Columbia	45	5 1/2 5 1/2	49	H. R. Coffin	H. R. Coffin	17	0	0
44	Mitchell	20	4 4	H	Cap. City Auto. Co.	Frank Zrbes	7	2	0
46	Maxwell	28	4 1/4 4 1/4	D	Claude Pinney	Claude Pinney	17	0	0
47	Maxwell	14	4 1/2 4	L	R. D. Britton	J. M. Macdonald	7	2	0
48	Locomobile	40	5 6	I	Fisk Rubber Co.	E. W. Belcher	7	2	0
49	Buick	24	4 1/4 4 1/2	S	Miner Garage Co.	E. Graham	Out		
50	Olds	36	4 3/4 4 3/4	M	R. Gregory S. Bryan	Gregory S. Bryan	Out		

FUEL CONSUMPTION PRIZE WINNERS

Cars costing \$1,500 or less—Ford runabout, No. 4, 9 gallons, 2 quarts, 1 pint

Cars costing \$1,500 to \$3,000—Knox, No. 42, 8½ gallons

Cars costing over \$3,000—Stevens-Duryea, No. 5, 11½ gallons

Hartford Rubber Works prize for perfect score for cars under \$1,500—Maxwell runabout

† Two-cylinder ‡ Stalled at start



HARTFORD RUN WINDS THROUGH BEAUTIFUL FORESTS AND OVER FINE ROADS



ATLAS ROADSTER FINDS PLYMOUTH HILL EASY

which cost 25 points. No. 20, a White steamer, was disqualified at Middletown. The No. 18 Thomas roadster had troubles, including a faulty radiator, and was not in evidence after the start. The No. 22 Mitchell went clean as far as Farmington and was there disqualified, but continued under protest. The Sheridan White was penalized 10 points. The four-cylinder Cadillac incurred 3 points at the Framington control. No. 27 Peerless had clutch and tire troubles to the extent of 22 points, tires doing most of the damage. No. 28 Olds reported with 9 points' penalty. No. 32 Knox had 1 point. No. 34 Columbia had ignition troubles and showed in with 3 points. No. 41 Atlas suffered 7 points. After passing out of the control the radiator on the big Columbia was found to be in need of attention and this was bestowed at the expense of 1 point.

No. 44 Mitchell suffered 5 points. No. 48 Locomobile had a puncture and lost 4 points. No. 50 Oldsmobile was pursued by tire troubles and was withdrawn. Rather a hard piece of luck was the case of Harry Tuttle in the 15-horsepower Stoddard-Dayton. The commutator cover had become loosened and caused a short circuit.

The Hartford control was a scene of animation after the cars had been reported out and all were allowed 10 minutes in which to replenish supplies of oil, gasoline and water, and also to attend to the wants of the inner man. On the first laps the large cars were allowed 5 minutes additional time and, if in making the first lap this 5 minutes was not utilized, it could not count as allowance for the second lap, which was an entirely new deal. The smaller cars were allowed

10 minutes' leeway at these controls. In short order the cars were sent away for the final lap and all got away in good order. In nearly every case of trouble reported, tires did the trick and mechanical difficulties were few and far between. Hal K. Sheridan in the White found it necessary to replenish his water supply and was taxed 10 points for doing it.

Despite the hard going over the Southington mountain as well as the Talcott mountains by the Avon pass, the showing on the second lap was very good. Take the big Locomobile runabout for example. The car had performed beautifully but a rusty nail in the road destroyed all chances of a perfect score. The same was true of the Franklin, which went down after crossing the line. D. J. Post's Pope-Hartford made the first lap clear and on time but within 10 miles of home on the last round tire troubles put it out of the perfect score contingent. Frank Dunnell in Ford made the entire trip on the high; the same is true of the two Stevens-Duryeas. Another feature of the contest was that every six-cylinder car entered went through with a clean score.

H. P. Maxim, chairman of the contest committee, was starter. The other members of the committee were C. H. Gillette, W. C. Russell, W. T. Plimpton, S. A. Miner and F. W. Dart. There were six controls—at Hartford, Middletown, Southington, Waterbury, Bristol and Farmington. The stretches over Southington and Avon mountains present hard going and the route is most picturesque.

ROAD TEST OF THE WELCH

Baltimore, Md., May 16—J. A. Rice's 50-horsepower Welch made a continuous run from this city to New York and return during a terrific storm and beating rain in 24 hours. The distance was over



HAL SHERIDAN IN WHITE STEAMER CLIMBING SOUTHTON MOUNTAIN IN HARTFORD RELIABILITY

445 miles. The car was driven by W. H. Kelly. He was accompanied by Arthur Norwood, Jack Shannon and Harry A. Mayer, the last named being the time-keeper. This is one of the cars that made a perfect score in the recent Maryland sealed bonnet contest. The car started from Rice's garage at 3 o'clock Friday morning and returned at the starting point at 7 o'clock the following morning. Four hours were allowed for unforeseen mishaps. The chief delay was the arrest of the party shortly after it left Philadelphia on the homeward trip. The party had to stop on the way back in Jersey City to purchase new clothes. Shannon is confident the car can make the distance, barring interference, in 18 or 19 hours. The party had trouble in picking the way back because of darkness and many forks in the road on the first test. The car will make the trip again with the low and intermediate gears removed, leaving only high and reverse.

BANQUET TO HARRY HOUP

New York, May 10—By way of bidding Harry S. Houpt bon voyage and also wishing Louis Strang and John B. Marquise good luck in their quest of grand prix honors with the Thomas car, the selling staff of the Harry S. Houpt Co. tendered the "easy boss" a banquet at the Hotel Marseilles last Thursday evening. Mr. Houpt sailed on the Lucania yesterday and on the same day the car and its crew took passage on the Adriatic. All are to meet at the training quarters Mr. Houpt will engage on the Dieppe course. Fred J. Titus acted as toastmaster at the banquet. John E. Bowles and Henry G. Vogel, of the Harry S. Houpt Co., were made joint guests of honor and responded to toasts. Theodore Sheldon was the most active spirit in the arrangement of the details of



CROWDS GATHER AT THE SOUTHTON CONTROL

the successful banquet. His fellow hosts were Fred J. Titus, A. D. Frost, R. D. Willard, F. G. Younds, F. K. Bowen, A. S. Robinson, F. D. Garringer, H. M. Pyke and Montague Roberts.

TEN PERFECT IN JERSEY RUN

New York, May 18—Perfect scores were made by ten of the twelve cars that participated in the 100-mile non-motor stop sealed bonnet contest held under the auspices of the North Jersey Automobile Club in New Jersey Saturday. The time limit was 5 hours 15 minutes. The two cars that fell by the wayside were S. Meredith's Corbin and R. W. Bates' Conover. The latter lost 1 hour 20 minutes in fixing punctures, and as this time will be allowed he was not disqualified. The Corbin car broke a part after completing the first 25 miles and dropped out. The cars with

perfect scores were as follows: R. Beattie, Buick; J. Gailick, Overland; H. B. Haines, Knox; J. Hengveld, Stevens-Duryea; G. A. Post, Winton; G. Vanderclock, Ford; G. DeWitt Brown, Maxwell; J. Schofield, Corbin, and Walter Hudson, Overland. The run started from Paterson.

TRUCCO WINS THE TARGA

New York, May 18—Brief cable advices announce that the Targa Florio, the big Sicilian road race, was won by Trucco in the Isotta Fraschini, who defeated Lancia in the Fiat by 13 minutes. Trucco is the man who captured the stock car race over the Padova Bolanenta circuit in Italy in which he defeated Nazzaro and others. This makes four big victories for the Isotta this year—Trucco's two abroad and the Savannah and Briarcliff in this country by Strang.

Straws Popular Among Women Motorists

TIME was, and not so many years ago, when the crumpled rose leaf that marred the happiness of the fair motorist was the lack of wind-resisting headgear. Her cry to milliners, "Make for me a hat that will stay firmly upon my head during a swift run and I will reward you with the half of my pin money," has finally been answered. So multiform, indeed, are the designs now seen in the shops that it would seem as though any woman—whatever her complexion, facial contour or apparent age—might readily find suitable motoring headgear. Straws deserve first place at this season, and among the finer weaves are medium-sized shapes in brown, burnt orange and black, these of the modified English walking and boat order which will stand considerable trimming in the form of big buckles, plumes and wings. Such shapes are exceptionally becoming to women past their first youth or those having strongly-marked features.

Coarse and fine straw braids employed alternately are most effective. This idea is pleasingly developed in the shape of a medium-sized navy blue boat hat, having a rather high, square crown, with four distinctly blocked upper corners, and trimmed solely with braided strands of self-colored taffeta. Chiffon folds of the same tint with a black outlined satin border are draped about the crown from front to rear, then drawn forward and tied beneath the chin, so that trimming and veil are practically in one piece.

Because of the protection afforded by the omnipresent veil some exceedingly tiny hats are used for motoring. In this class are the miniature Alpines of fine and coarse natural-colored straws, their deeply-indented crowns and closely-fitting brims trimmed with black velvet and black birds. These look immensely chic when perched upon masses of puffs and curls, as do also the envelope hats with their sharply up-turned left brims distinctly outlined with a contrasting binding, and the little perky bows fluttering against the rather flat crown. Of the same order are the small fine straw hats, brimless at back and



SCARF HOODS ARE POPULAR AND PICTURESQUE

slightly pointed over the brow, that are bound and banded broadly with dark kid matching the small rosettes which decorate the crown and the bandeaux which tilt them ever so slightly to the right side of the head. Leather and kid bands and rosettes are a feature of the trimming of the rougher type of hats, meaning those used for long and hard tours of several weeks' duration. In this event the trimmings match the strappings of the corded rep or rubberized pongee motor ulster. Panama hats of modest dimensions and tailored finish are certain to be much worn during the summer. Their popularity is largely due to the fact that they have flexible brims which may be rolled in whatever direction is most becoming to the individual face. They are trimmed in various ways. Crowns are of diversified shape, with the Tam o' Shanter version rather in the lead among them.

Satin motoring hats have come into being with the craze for fabric-covered headgear, and in their dip-brimmed, peak-crowned form are deemed immensely smart, particularly for use with the rubberized satin coats. They are usually decorated with yard-long scarfs of self-colored soft silk having deeply bordered fringed ends of contrasting hue, knotted in single bows at the left side, slightly toward the back. Brimless turbans that dip at the back are not universally becoming, as there is nothing to relieve the outline severity at sides and front. However, they are considered ideal wind reuffers, and with some women that is still the chief motive.

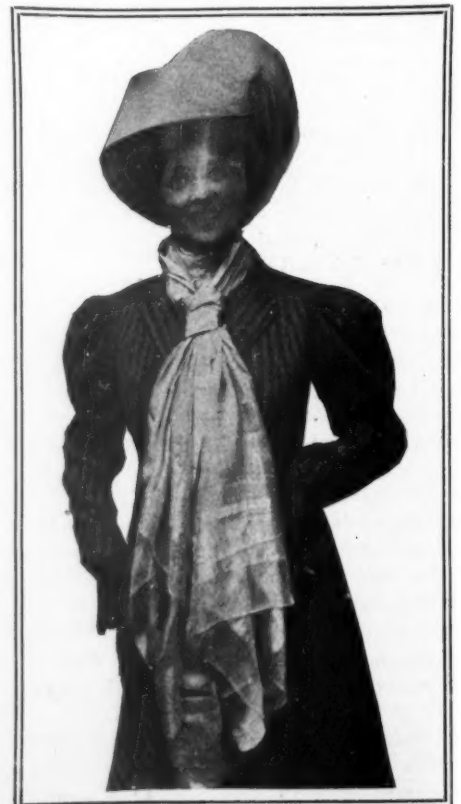
Visored caps similar to those worn by men are used almost exclusively by some

women, as they are to be found in all the popular tints in ponges and mohair, in cloth plaids and mixtures, and in black, navy, tan and gray leather. Such shapes certainly lend a trim effect to feminine motoring garb, and the wide visor protects the eyes from the sun when no veil is worn.

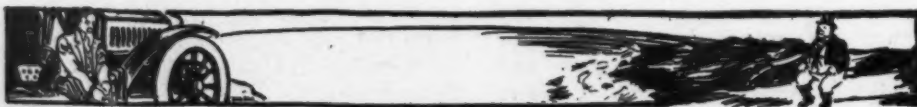
Bonnets with brims slightly depressed over the brow are returning to favor with motoring headgear. In their present form they are a boon to elderly ladies whose dig-

nity forbids them to adopt the frivolous looking Alpines and Panamas as well as the unspeakably coquettish toques.

Crush felts precisely like the "bush rangers" used for fishing and hunting excursions by the stronger sex are affected by very young girls who go in for the daringly unique. When they have poked their pink fingers into the high crowns to make them bowl-shaped and tied the flapping brims over their ears with broad ribbons the effect of the improvised motoring hat is dangerously demure.



DUPLEX VEIL USED BY MOTORISTS



Little hoods which strongly resemble nightcaps are made of mohair, satin and kindred rubberized fabrics, and designed to be buttoned into the inner side of the hat crown and let down whenever it is desired to protect the hair and the ears from dampness. Their lower edges are doubly shirred upon a ribbon which ties beneath the chin and over this may be turned the coat's storm collar so that only a small portion of the face need be exposed to the elements.

Attachable hoods are exceptionally popular with both men and women. Some of them, arranged to entirely cover the hat, are friar shape; others are tight-fitting like a knight's helmet and vastly uncomfortable, despite a generous number of air holes. Practically the best hood is wired to stand slightly away from the head and provided with a waist length shoulder cape, so that when seated the wearer is well protected from the rain.

To drape the motor veil in an eminently becoming and entirely adequate manner is a task "not to be undertaken lightly and unadvisedly." No matter what may be the size of the hat, the veil should be 3 yards long and at least half a yard wide. As every woman knows, the first mission of the veil is to become the wearer and the second to protect the face and hair from dust and sun. To do this the back as well as the front of the head must be thoroughly covered while one is riding, but the gauze so arranged that it may be thrown aside quickly.

Veiling materials were never more bewitching. The crepe chiffons and chiffon cloths which wear interminably are to be found in all the desirable colors finished



BOTH PRACTICAL AND SERVICEABLE

with plain, hemstitched or embroidered borders. Some of them have self-colored satin borders attached with white or black chain stitching. These borders are of three types. One shows a succession of graduated stripes, another a 1/2-inch edging surmounted by a 4-inch band and a third simply the very broad edge. Self-colored disks finish many of the new veils. They are often run across the ends merely and are of uniform size, or they entirely border it in rows ranging from nickel to half-dollar dimensions.

Plaidd veils are in gauze, sewing silk and chiffon of various tones, but the preference is for brown of a reddish cast, which does not attract the sun's rays, and for gray of a pale tone, which is supposed to become the average complexion. Navy blue is also in high favor, and, like green, is considered restful to the eyes; but smartest of all are those veils of pure white with wide borders of shaded tan or porcelain blue. The veil with a mica mask is worn by numbers of enthusiasts. This mask is about 4 by 16 inches in size and set into the chiffon veil with machine stitching.

Rainproof satin is much employed for the voluminous scarf hoods used as storm protectors of small hats worn with the English plaidd tweeds and mixtures, as well as with the lighter rubberized fabrics. These hoods are of full width satin, shirred on a rubber band and drawn over the head, closing beneath the chin with shirrings and large buttons, whence the ends fall over the shoulders or to the waist. Chiffon mask veils, shirred across the front of the hat, fall loosely over the face.

Women who eschew the all-enveloping motoring coat in favor of the trimly tailored mohair or serge coat and skirt costume of the fashionable chevron stripe effects are adopting the enormously long

and wide bridal motoring veils. These are usually of the handsome satin bordered white, gray or champagne chiffons, 3 by 1 1/2 yards in size. One side is so draped over the front of the hat that it will protect the neck, and the remainder over the back of the hat, the ends crossed at the nape of the neck, then drawn loosely forward and knotted four-in-hand manner below the throat. When not in the car the wearer allows the veil to flow loosely from the back of the hat precisely as does the conventional wedding veil.

Clan plaidd silk, rubberized, is extensively used for coats, which in their latest development show the singly box-plaidd back, the narrow side gores and the wide arm-sized sleeves, slightly gathered all around. Broad biased bands simulating round yokes, punctuated with silk-covered, metal-bound buttons are much in vogue and turned-over collars and turned-back cuffs are deep and pointed rather than straight. With the dark-toned clan plaids are worn bordered chiffon veils matching the grounding of the coat. The veil pictured is side plaidd at one end, drawn in over the crown's top toward the back and secured by the shaped straw band. The remaining end is then drawn from left to right over the face and attached to the back of the hat.

In no way is the duplex of four-ended veil more valuable than when it is necessary to veil a hat of unique shape, such as the pictured modified Gainsborough with irregular brim and dented crown. The joining shirring of the rear section is brought to the front of the crown and the ends drawn over the ears and knotted beneath the chin, while the forward section is draped over the face and the ends crossed at the back, thus firmly securing the hat. In this instance the natural colored straw of the hat matches the hue of the satin insets of the collar and cuffs of the taffeta motor coat, while the veil and the hat trimmings which it protects are dark green to harmonize.

Contrasting all these latest makes with the fashions of the early days of motoring, one cannot help but come to the conclusion that the women who motor now are much more comfortably clad than the pioneers among the fair sex. In these luxurious times the clothier and the hatter apparently have thought of everything that a woman motorist might need. Of course, the fashions change from year to year, but what woman would be content to wear the same style cloak or hat from year to year? But the fair sex is no better off than the men, for they, too, have been well looked after by the designer and if a man is not comfortably clad it is not the fault of the dealer.



TRAVELING VEIL, FOUR-IN-HAND TYPE





The Readers' Clearing House



FLANGED WHEELS FOR RAILS

Hunt Dale, N. C.—Editor Motor Age—Kindly give the names of the manufacturers, if any, who market flanges for attachment to motor car wheels, thereby making them adaptable to run upon the steel rails of a railroad.—S. T. Moser.

There is not any maker who manufactures flanges specially for motor car wheels. Charles J. Glidden and other motorists who by the use of flanged wheels have traveled on railroad tracks, had the wheels built to order.

WELDING MOTOR SPRINGS

Denison, Ia.—Editor Motor Age—I am having an exceedingly hard time to have a motor spring welded by blacksmiths; they invariably break as soon as put into use. Is there any formula or precaution for doing such work that will make it a satisfactory job?—E. C. Chamberlain.

The motorist never attempts to weld a broken spring, the general custom being to secure new leaves for those broken, and if all leaves in the spring are broken then to secure a new spring.

DELINEATES IDEAL CAR

LeMars, Ia.—Editor Motor Age—One of the most interesting departments of Motor Age has been the one given to specifications for ideal cars by various readers. This ought to prove valuable information for manufacturers and, coming from the old-time motorist and repairman, as many of these should, would tend to the making of an improved car, rather than let the fancies of those having more cash than experience dictate what should be made. Many readers, giving good specifications, have forgotten the all-important question of reduced weight and larger wheels. Must we still have a 40-horsepower (?) motor and pay for the fuel and electricity it will consume, also the oil, to carry two persons over a country road as fast as they ought to go? Have we not in vain tried the makeshift "shock absorber" to overcome the evil effects of the small artillery wheel? Have we not worn ourselves, our tires, ruined our bearings, springs, frames, etc., by these small wheels? The thousands of sales robbed from the "trundle" wheel makers by the buggy freak—one might call it—having only one or two advantages, those of large wheels and light weight, is doing a lot to bring about the happy medium we should have had long ago. Would not suspension wheels of large diameter, say, 36 to 40 inches, laminated and trussed wood frames, shaft drive, sliding gear, two or four-cylinder air-cooled motor, under hood, with longer strokes than is now common, also larger cylinders, with Atwater-Kent kind of ignition, having light

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems and invites a discussion of pertinent subjects. Correspondence is solicited from subscribers and others

THE IDEAL MOTOR CAR

Horsepower—35-40
Number of cylinders—Four, two-cycle,
unit power plant, three-point suspension
Wheelbase—115 inches
Springs—Semi-elliptic front, platform
rear with shock absorbers
Clutch—Standard multiple disk
Transmission—Selective, four speeds and
reverse
Jump spark ignition—Atwater-Kent system
and magneto. Two sets of plugs
Control spark and throttle on top of
wheel and air adjustment to carbureter
on steering wheel column
Body style—Aluminum straight line
Passenger accommodation—Five to seven
Kind of lubrication—Force feed
Tires—Fisk type detachable rim
Wheels—36 inches
Drive—Shaft or double side chain enclosed,
run in oil
Weight—2,500 to 2,700 pounds
I prefer a water-cooled motor with fly-
wheel in front; clearance, not less
than 11 inches; gear ratio, first, 12
or 15 to 1; second, 7½ to 1; third,
4½ to 1 direct; fourth, 2½ to 1;
and reverse; roller bearings both front
and rear wheels; engine made with
inspection plates so connecting rods
can be examined with a slight amount
of work
Denison, Iowa C. CHAMBERLAIN

detachable survey type tonneau, medium wheelbase of say, 90 to 100 inches, to weigh from 1,000 to 2,000 pounds actual, and to sell for the same number of dollars, be what the average business man would want—and could afford to run for both business and pleasure? And would the demand for such a machine be so great one maker could not supply it, or would he starve? This information is sought by a number of makers and if the readers of Motor Age will express themselves freely the same will do a world of good for all concerned. Articles that cost much experimenting, to show the superiority of large wheels, were returned as "unavailable," the editors claiming "nothing must be written to cause the makers extra expenses" that the large wheels would. But has not the loss of the thousands of buggy freak sales done them more harm? The American manufacturer had to show his foreign cousins how to make an 18-pound bicycle that would carry any man, and carry him faster, safer and easier than any other bicycle in the world, and the sooner our makers and buyers come to know that we can do the same thing in motors the better it will be for the business.—Reader.

VALVE STEM BURNS

Benicia, Cal.—Editor Motor Age—I have a single-cylinder motor which is air-cooled around the body of the cylinder and has a water-cooling chamber on the cylinder head. I have had trouble for the last

3 months with the exhaust valve stem becoming burned where it joins the head. I had no trouble with the original valve, but had to replace it as the slot had cut through the end. I have since made three new valves—the first from a forging and the second two from cold-rolled steel. The first broke off at the head, after running about 3 weeks, and seemed badly burnt, and it is now necessary to replace the third one, as the stem is burnt to about half the size. I have carefully ground each valve with powdered emery and they run nicely at first. Do you think there is something wrong in the cooling, or is the trouble caused by the valve not opening enough?—W. S. Chisholm.

It is probable the trouble may be caused by the hole in the casting through which the valve stem works having become worn sufficiently to permit the exhaust gases to escape around the stem to a certain extent, which would readily account for the burning at the point in question. Watching the motor closely while working should reveal whether this is the case or not. Apparently it is not due to any defect in the cooling, though if the waterjacket mentioned includes the exhaust valve pocket, an examination may show that this portion of the cooling system is not working as efficiently as it did originally. In case the cause is found to be due to the worn valve stem hole, the best remedy is to drill the latter out and fit a bushing. Of course, a larger valve stem might be used, but as this would be apt to increase the weight of the valve it would not be an advantage. The cam and roller of the exhaust valve-operating mechanism may also show considerable wear, thus reducing the amount of opening, which would also cause overheating.

GREASE FOR SILENCING GEARS

Jersey City, N. J.—Editor Motor Age—We have read Harry S. Hall's inquiry concerning the use of grease-sawdust "dope" for silencing gears. The Joseph Dixon Crucible Co. manufactures and sells a special graphited wood fiber preparation known to the trade as No. 688, to be used in all inclosed gears except where there are small oil holes leading to the bearings. This grease has incorporated in it a small percentage of graphited wood fiber and flake graphite, the whole being incorporated in a petrolatum grease. The fiber is obtained from kiln-dried, straight-grain cedar fiber. The object of this cedar wood fiber is to form a cushion for the gears to mesh with, and instead of having actual metallic contact, they are separated by a thin, elastic cushion. The graphite used is Dixon's Ticonderoga pure flake lubricating graphite, the function of which is to eliminate the minute irregularities ex-

isting in the metal surfaces by filling in the low spots and forming over all a thin, tough, veneer-like coating. When this grease is used in the transmission gearbox and the gears are shifted, danger of chipping is eliminated by the cushioning effect of the fiber and the veneer of flake graphite on the gear teeth. Because of the sponge-like nature of the fiber there is no dripping or throwing of the lubricant out of the gearbox. At the shows we have had sets of gears running at high speeds with the covers removed and there was no grease thrown. It has been observed that after this grease has been used for a short time it takes on the consistency of a soft vaseline.—Joseph Dixon Crucible Co.

STANLEY MADE IN NEWTON

Delphos, Kan.—Editor Motor Age—Can Motor Age tell me where the Stanley steam car is built?—W. O. Raub.

The Stanley steam cars are manufactured by the Stanley Motor Carriage Co., Newton, Mass.

TWO-POINT SWITCH ONLY

New York—Editor Motor Age—In the Readers' Clearing House of April 25 A. D. Carpenter asks for a correct diagram of how to wire eight cells. The diagram published does not tally with the explanation, inasmuch as the two wires leading to point No. 3 of the switch connect the batteries in series—multiple at all points of the switch. Therefore, a series of four cells cannot be used singly. A two-point switch only is needed, the switch lever to make contact on both points when series multiple is desired, and to either single point for one series.—Edwin Archer.

LIKES TIRE PROTECTORS

Orfordville, Wis.—Editor Motor Age—I noticed in Motor Age March 12, on page 24, an article headed "Protective Treads on Tires" in which Motor Age informs the public through this article that it must or ought to select a tread where the rivet heads do not come in contact with the rubber. Now, I wish to inform you that the rivet heads on my tire come directly in contact with the rubber, and that there isn't the slightest bit of friction or injury to the casing in any way, shape or manner. I am talking from experience and not theory.—I. J. D. Fairhurst.

SINGLE-TREMBLER COILS

London, Eng.—Editor Motor Age—The subject of coils for motor car ignition being a particularly important one I would like to lay before Motor Age readers a few deductions regarding the single-trembler coil. A single-trembler coil has advantages over the multi-trembler, the principal one being good synchronism, and good synchronism cannot be too lightly treated. As a secondary advantage it can be regarded as an economizer of time and trouble taken in adjusting one trembler instead of, in the case of a four-cylinder coil, four tremblers, yet the advantages of

THE IDEAL MOTOR CAR

Horsepower—45-50
Number of cylinders—Six
Wheelbase—120 inches
Springs—Full elliptic
Clutch—Cone, cork inserts
Transmission—Sliding gear progressive
Number of speeds—Three forward, one reverse
Brakes—One foot and one side lever, both working on rear wheels
Jump spark ignition—Double set of plugs, storage batteries, high-tension magneto
Body style—Touring
Passenger accommodation—Seven
Kind of lubrication—Gravity, with pump in crankcase to pump oil back to tank
Quick detachable tires
Resilient wheels when they are perfected.
Simsbury, Conn. C. W. SCHWARTZ.

Horsepower—20-25
Number of cylinders—Four
Wheelbase—108 inches
Springs—Semi-elliptic front, full elliptic rear
Clutch—Cone, cork inserts
Transmission—Selective
Speeds—Three forward, one reverse
Brakes—Three, two on rear axle, one on drive shaft
Jump spark ignition—Atwater-Kent system; Apple dynamo with storage battery; two sets of plugs
Body style—Straight line
Passenger accommodation—Five
Lubrication—Force feed
Tires—Quick detachable Michelin, 34 by 4 inches
Miscellaneous—Air-cooled engine, Holley carburetor, cylinders cast separately, valves in cages.
Burns, Kan. LLOYD K. WHITE.

synchronism with this type of coil are mitigated to a large extent by the general sluggishness of the trembler, in fact, single-trembler multi-cylinder coils can almost be regarded in the light of a governor on the engine, but it is in the unalterable, adjust or even cut out the governor as one could, for instance, a mechanical device for such purposes, for the simple reason that it supplies the life of the engine.

The first question is, why does it act as the part of a governor? The answer is simple, there is a limit to the rapidity of the vibrations of the trembler; when this speed is over-run the high-tension spark ceases—that is the limit of the engine—depending as it does entirely on the coil

supplying a spark at a suitable time for firing the charge. It may be, of course, quite possible for the engine to develop a greater number of revolutions and a higher mechanical efficiency, but if the spark is not there ready to allow that greater speed, of course it follows that it will not be attained. Then one naturally asks why, if synchronized ignition with one coil and a distributor gives such satisfactory results on some cars, why should not, what in effect seems the same thing, one trembler with four induction coils work four cylinders? In every instance single-trembler multiple coils for four cylinders have an electro-magnet in addition to the four units comprising high and low-tension winding, one for each cylinder. This electro-magnet has for its object to break the primary current by attracting a hinged armature, which, in its downward motion, breaks the lower platinum blade from the upper platinum screw in the usual manner known with Castle induction coils. Now each unit, comprising high and low-tension winding, contains as usual a soft iron core composed of a bundle of soft annealed iron wires in the middle, round which the wires are wound. Each primary unit is wired in parallel in the usual manner, the four units being wired in series with the additional electro-magnet. In ordinary induction coils with a trembler to each unit the trembler is usually mounted over the center of the unit, the core performing its usual function of increasing the magnetic field, and also attracting the trembler with the object of breaking the platinum points. The core is retained in each unit of the single trembler coil with the object of increasing the magnetic field. The path of the primary current is first by way of the electro-magnet of the separate trembler, and around the primary of the particular unit which is in contact for firing its cylinder. In the usual multi-trembler induction coil this double winding is dispensed with. The primary current being broken in the circuit of the actual primary of the induction coil itself by means of its own core and

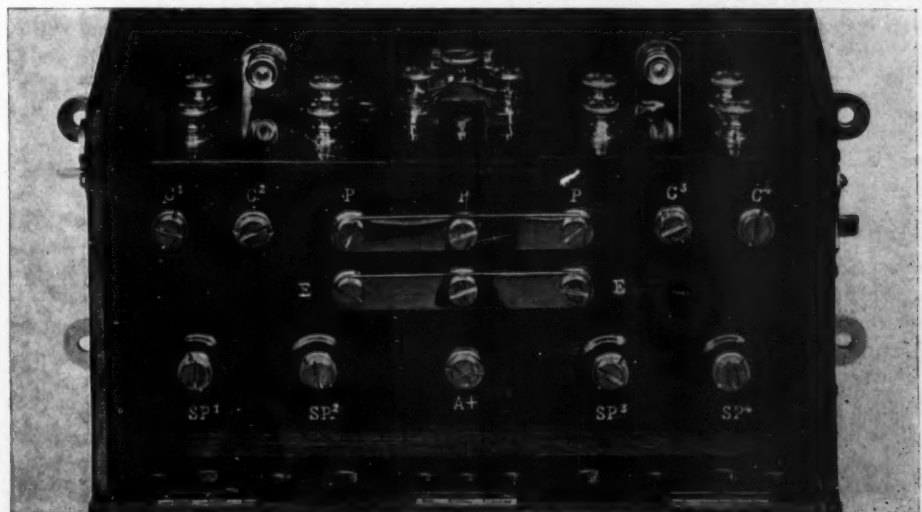


FIG. 1. THREE-UNIT, SINGLE-TREMBLER CASTLE IGNITION COIL

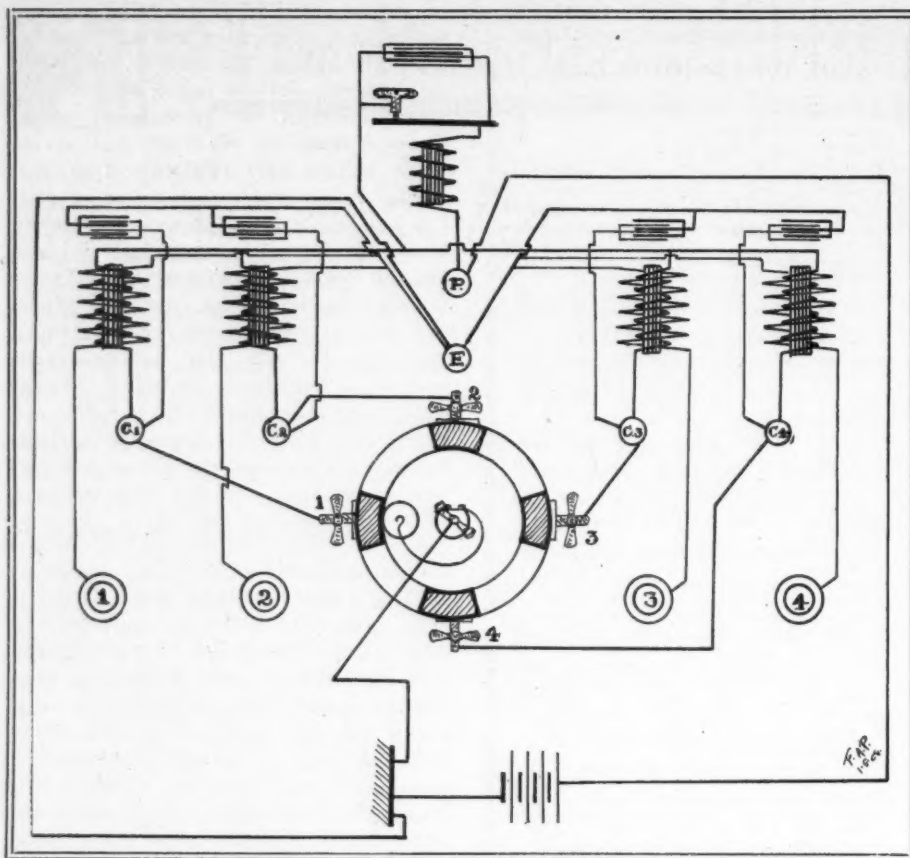


FIG. 2. DIAGRAM OF WIRING FOR CASTLE SINGLE-TREMBLER, MULTI-UNIT COIL

its own trembler. It follows that the primary current in the case of the single-trembler multiple coil has double work to do, to magnetize the core which works the trembling apparatus, and to magnetize the core of the induction coil; it follows again that there are two resistances to be overcome, one in the induction unit and one in the trembler electro-magnet. This resistance in the circuit of the primary causes a very considerable lag in the formation of the secondary current. The lag is so great that the engine speed is very considerably reduced in consequence of the coil being unable to produce a sufficiently quick number of effective sparks to fire the successive compressed gases. It is not a question of fitting a quicker trembler—no matter how quick the trembler may be—it is the impossibility of sufficiently quickly magnetizing the two primary series coils.

To arrive at the actual difference between a single-trembler multiple-unit coil and a coil of equal capacity and make, the unit of which was fitted with its own trembler, the following tests were carried out: To obtain the maximum number of separate inductive sparks under 90 pounds square inch compression when the coil was running on a wipe commutator with segment contact = to 54°

Single trembler to multiple unit,
3,408 per minute.

One trembler to one-unit coil,
4,936 per minute.

The difference is forcibly demonstrated here, showing as it does the large difference in favor of the one-unit one-trembler coil of 45 per cent. These figures mean

that if these coils were fitted to a four-cylinder engine, the single trembler coil would fire that engine under the best conditions at a maximum speed of 1,704 revolutions per minute, and the multi-trembler coil would fire that engine up to a maximum speed of 2,468 revolutions per minute.

The comparative tests of the single-trembler coil are well substantiated by some figures which were recently published by a firm of ignition manufacturers, whose maximum figures under compression were computed at 2,500 sparks per minute, or capable of firing a four-cylinder engine at 1,250 revolutions per minute.

Now, if, by some simple and inexpensive process, it is possible to so transform the single-trembler multiple coil as to give as good results as the standard coil, as far as rapidity of induction is concerned, it is removing one of the grave drawbacks to the use of this system of ignition.

This leads to a short description of the Castle condenser coil. The coil itself is seen in figure 1, suitable for four-cylinders and containing three units, the center unit containing the electro-magnet and trembler, and the side units being double induction units. At the top of each double induction unit are cut-outs, formed of two pillar posts with lock nuts and a catch bridging the two posts. These cut-outs are inserted in and form part of the primary winding of the induction unit. When the catch is disconnected from one post, as it is in two cases in the photograph, that particular unit is out of action.

Looking at the coil it appears very simi-

lar to any other single-trembler with the exception of the second bar connecting the center unit with the side units, and marked E. A wire is led from this to a good frame connection, or, for choice, to the earth button on the commutator lid, and then to the frame from there. The terminal at the back of the case over each double unit box holds each double unit firmly to the main case. The trembler in this particular coil is detachable. The two finger bolts between the platinum screw bridge and the back block, binds the whole ebonite top with fittings to the unit box. Figure 2 gives a complete system of the wiring of this coil both internal and external. The one important addition to the ordinary single-trembler coil is seen in the four extra condensers, one to each induction unit, besides the ordinary condenser fitted to the trembler. This is the feature of the Castle condenser coil. It will be seen that one side of each unit condenser is connected together and run to the earth terminal. The other side of each condenser is run to the terminals C1, C2, C3, C4, which run to the insulated terminals of the commutator respectively. Everyone who has studied the action of the induction coil will know the importance the condenser plays in this system. One of its features is that it helps the rapidity of the break without which rapidity the inductive result would be negligible. Now, it will be apparent that if the trembler stops through its own inertia, the inductive result will still be maintained when the break of the commutators occurs. This system also increases the heat of the spark when running, by reason of the fact that eight times out of ten when the segment break occurs, the platinum points of the trembler are together—a spark occurs—this spark is added to the foregoing trembler spark, giving one long hot flaming spark. With this system we get a combination of the excellent uses of the trembler and the non-trembler coil, the trembler coil for low speeds, and for starting, hill climbing, top gear with slow engine, etc., and the non-trembler at the high engine speeds when one wants the utmost out of the engine. A test of this coil made under exactly the same conditions as the previous tests proved its capabilities. The maximum speed of the driving motor gave me 8,160 separate induction sparks per minute under 90 pounds square inch compression, capable of firing a four-cylinder engine at 4,080 revolutions per minute. In referring back to the single trembler multi-coil results these are shown at 3,408 sparks per minute, or 1,704 revolutions of a four-cylinder engine, and the multi-trembler coil is shown at 4,936 sparks per minute, or 2,468 revolutions of a four-cylinder engine. This shows an advantage of the condenser coil of 140 per cent over the single-trembler ordinary multiple coil, and 68 per cent over the multi-trembler coil, both of which are most favorable.—S. Doak n.

THE MILLER GAS ENGINE CYCLE

THE two and four-cycle engines now in use are outgrowths of the Beau de Rochas cycle, supposed to conform to his four axioms covering the ideal conditions of gas engine operation. These axioms are as follows:

- 1—Highest possible pressure at the beginning of the stroke.
- 2—Maximum speed of expansion.
- 3—Expansion to the lowest possible pressure.
- 4—Maximum cylinder volume with minimum wall space.

The Beau de Rochas cycle falls short of these conditions, because:

1—The highest pressure is not reached with a given compression on account of imperfect scavenging.

2—The speed of expansion is limited to that of the piston, which has a limit for mechanical reasons. In this respect the "free flying piston" engine is superior.

3—Expansion is not carried very far. Pressure as high as 60 pounds per square inch are rejected to the exhaust.

4—Maximum volume with minimum surface is counteracted by excessive wall cooling necessitated by lubrication, preignition and charge reduction conditions.

With a view to overcoming these disadvantages Robert Miller has developed an internal combustion motor having a modified cycle, and which combines the features of lightness with frequency of impulse and a minimum number of parts. In this new motor the Miller cycle modifies the foregoing conditions in the following manner: The pressure at the beginning of the stroke will be higher, as the cylinders and clearance spaces are thoroughly scavenged by an excess of cold pure air. The speed of expansion is increased by allowing the burning charge to expand simultaneously in a supplemental expansion cylinder during the expansion stroke only.

To illustrate this, we will assume a piston speed of 900 feet per minute, and a stroke of 12 inches. The ordinary cylinder will expand its charge from 300 pounds to 45 pounds per square inch in 1-900 of a minute. The Miller cycle expands this same charge between the same limits, in one-third of 1-900, or 1-2700 of a minute.

This method of increased expansion differs widely from the two commonly used. The true compound gas engine—two-stroke expansion—fails because of the low specific heat of the working fluid; the transference of highly heated gas through small ports and valves, which must be kept cool to insure durability, and the enormous amount of cooling surface involved in a high and low-pressure cylinder. The other method, using a small charge—either cut short on the suction stroke or expelling some on the compression stroke—involves a long stroke, and what is gained by increased expansion is lost by increased time of contact with cold cylinder walls. Wall cooling is effected in the Miller

cycle by the scavenging action of the cold air acting upon the inside of the cylinder. The cycle itself gives a cool cylinder wall, and the exhaust is used as an ejector to draw cold air over the outside of the walls, where necessary, thus rendering the engine independent of fans, pumps, blowers or radiators.

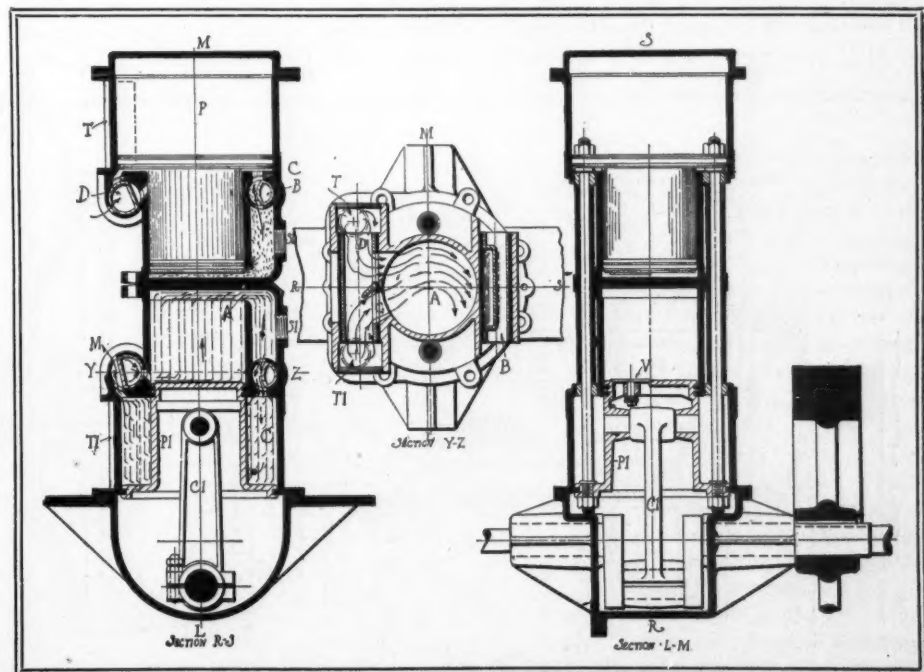
Referring to the accompanying illustration, pass through a complete cycle in one cylinder, the drawing showing a double-acting engine. Assume that in the clearance space of the upper cylinder an explosion is about to take place. At that moment the valve B being open, establishes communication between the chamber A, and the expansion cylinder C, the valve D being closed. The result is that the force of this explosion will be expanded in the cylinders A and C, so the expansion will be very rapid, and as the piston reaches the end of its stroke the volume of the combined cylinders A and C will be much greater than of A alone. The expansion must then have been carried to somewhere about 10 pounds terminal pressure, with the result that very little heat has gone through the cylinder wall. While the differential piston was moving in this direction, having on one side the explosive impulse, on the other side it was compressing the pure air that is contained between it and the head.

As the differential piston nears the end of its stroke the valve D will open so the remaining pressure in the combined cylinder volumes A and C will escape through one port in this valve. As this pressure dies away the compressed air from the preliminary compression chamber will go through the connecting pipe, through the valve D and through the ports G. Coming through the ports G, this air will traverse

the body of the cylinder A around through the clearance, through the valve B, around through the chamber C, and out through the exhaust port of valve D. Being in volume about three times as large as that of the cylinder A, this pure air will thoroughly scavenge the cylinder.

The piston is now ready to start on its return stroke. The valve B closes, and the valve D remains open. The contracted portion of the differential piston compresses pure air in the chamber A, while the differential portion of the piston sweeps out the combined burnt gas and air through an exhaust port in the valve D. At a predetermined period of the stroke the fuel pump injects the charge into the chamber A, where it is thoroughly mixed by the whirl of the compressed air from the piston. Just before the stroke occurs the valve D is closed, and the valve B gradually opens. During this time the trapped gases in the chamber C are gradually brought to approximately the same pressure as exists in A. Ignition then occurs, and the cycle repeats.

It must be remembered that on the inward stroke, while the differential piston is on its smallest portion compressing the new charge, and on its larger portion expelling the burnt gases from the chamber C, on the other side it is drawing in a new charge of air through a check valve, or through a modification in the valve D. This engine renders self-starting very easy. It is hardly possible with the clutch out that it would stop on dead center, because it would be against the full compression in either combustion chamber. It would, therefore, stop somewhere near mid-stroke. If the fuel pump injects fuel into the chamber A, and also into the chamber C, ignition in A would travel through to chamber C, and a powerful impulse would be given to the crankshaft.



DRAWING ILLUSTRATING THE CYCLE OF THE MILLER ENGINE

HISTORY AND CONSTRUCTION OF CLUTCHES

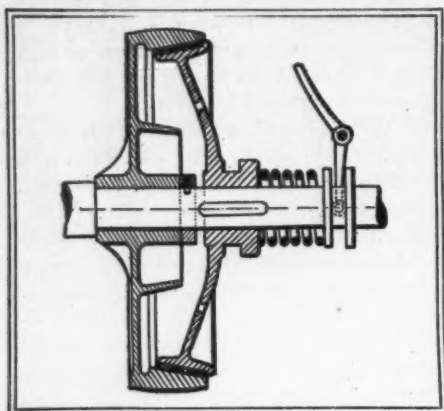


FIG. 21

WITH proper usage, cone clutches with leather faces seem to last indefinitely. I have accurate knowledge of cars that have surely been driven 20,000 or 30,000 miles without replacement of leather on the cone face. My own experience is confirmatory of this. I have driven several cars with cone clutches and have yet to experience any trouble from the wearing of the leather face. I recently saw a clutch that had been used for about 2,500 miles by me that gave no evidence of wear, neither had it received any attention on my part, except to dose it a few times with neatsfoot oil.

There is one defect in the operation of the cone clutch that has caused considerable trouble. The clutch necessarily requires some end or axial motion and a slip-joint that will permit it. An ordinary square slip-shaft has been commonly used. Instances have been found where these square slip-shafts have jammed under load and seized, so as to refuse to permit of the disengagement of the clutch at critical moments. This is a very serious objection, and one that has not been altogether satisfactorily overcome. Improved materials,

EDITOR'S NOTE—Paper read before the American Society of Mechanical Engineers at New York, May 12, by Henry Southier. Discussion to be continued at Detroit, June 25-28, in conjunction with the Society of Automobile Engineering. Part II. Part I appeared last week.

increased dimensions and better facilities for lubrication have cured much of the trouble. Generous feathers and splines have been resorted to, which present working surfaces that are normal to each other and which avoid any cam-like or wedging action which may exist with a square shaft bearing in a reasonably easy fitting square hole. Here, again, the perfect freedom introduced by double universal joints plays an important part, the square shaft being very much less apt to bind when perfectly free to center itself.

There has been a considerable variety of opinion as to the proper cone angle. Various authorities have placed it all the way from 7 degrees to 20 degrees. The French have settled down on an 8-degree to 9-degree angle as being about right for a leather-faced cone. Several important American makers are using 12 to 13 degrees, several 10 degrees, and others 8 degrees.

The following table gives the dimensions for cone clutches used on three different models which are probably as successful as any:

Area of flywheel.....	113.1 sq. in.	78.7 sq. in.	73.59 sq. in.
Angle, one side.....	8 deg.	8 deg.	8 deg.
Radius, maximum	8½ inches	8½ inches	7¾ inches
Spring pressure	375 pounds	320 pounds	250 pounds
Horsepower by A. L. A. M. formula.....	48	42	40

The metal-to-metal cone clutch is a good one. It may be made smaller in diameter and with a sharper angle, say, 7 degrees, without seizing. It may be used in connection with copious lubrication. This form has been and is used only to a small extent. The dividing line between slip-

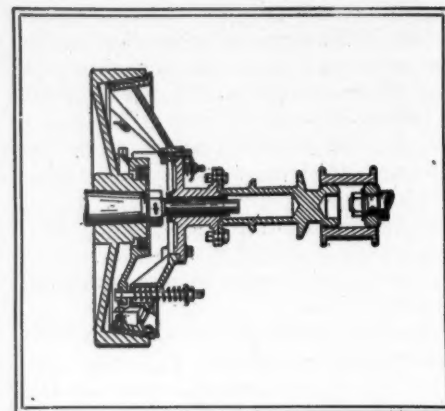


FIG. 22

ping and seizing is narrow. Another form of cone clutch has an aluminum male member of about 12 degrees angle bearing against cast iron and with cork inserts in the face of the male member. This clutch is not easily affected by a lubricant and, in fact, may be run with copious lubrication. This type has not been widely enough used yet to give sufficient knowledge as to the possibility of general application under many varying conditions.

Up to this time I have referred entirely to what may be called a direct-acting cone, one where the male part of the cone moves

axially toward the engine. This is well illustrated by figure 21, which is about the simplest form of leather-faced cone clutch. Modifications of this are many, figure 22 showing a clutch of the same principle, but in place of having one strong actuating spring surrounding its axis, it has three

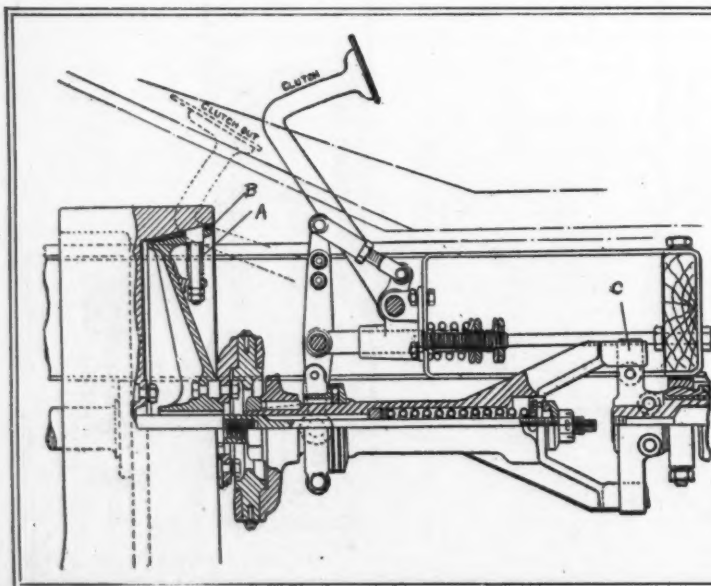


FIG. 23

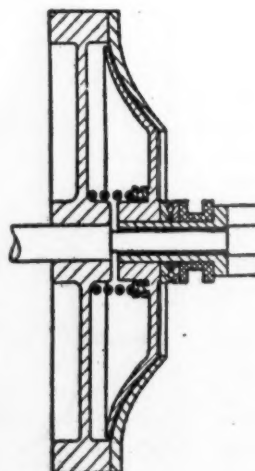


FIG. 27

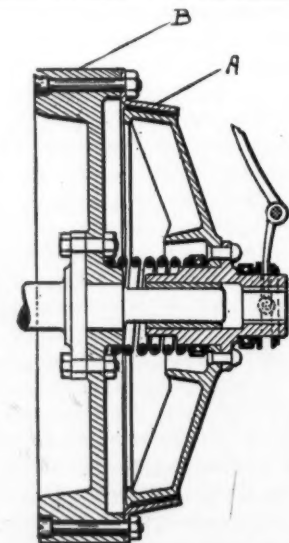


FIG. 28

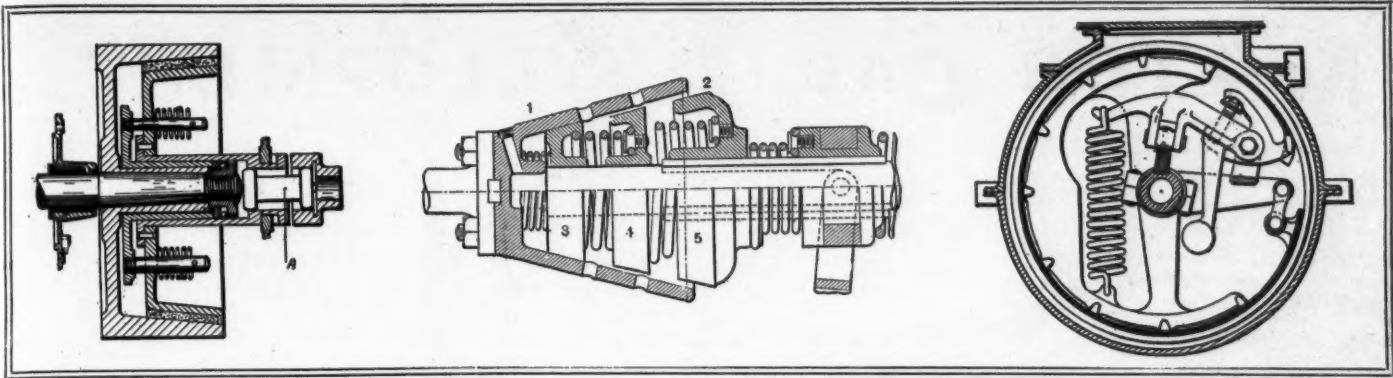


FIG. 25

FIG. 26

FIG. 27

weaker spiral springs nearer the periphery of the male member. Figure 23 is a clutch used for a 50-horsepower car, with a cone angle of 13 degrees, a diameter of about 16 inches, a total frictional area of about 128 square inches, and axial pressure of 375 pounds resulting from spring. This cut clearly shows a small spiral plunger spring, A, underneath the leather face, B, to make it pick up its load more quietly and smoothly. This cut also shows a form of slip-joint back of the clutch, C, which, although it does fairly good work, is not on the whole as satisfactory as the double-toggle universal joint.

In direct contrast to this clutch is the one shown in figure 24, where the diameter of the cone is very much less, not to exceed 10 inches. This is a clutch used in connection with a car developing 30 horsepower, A. L. A. M. rating, and one that has at times developed much higher horsepower on the block—as high as 36 horsepower. The clutch angle is 13 degrees and the frictional area the first 2 years this car was built was 86 square inches, but this has recently been raised to 96 square inches, the spring pressure remaining at 400 pounds. It will be noted at the bottom of this cut that there is a sketch showing the spiral spring plungers underneath the leather. Figure 25 shows an early form of cone clutch used about 1902 or 1903 for a car of about 20 horsepower. This has multi-springs for creating the proper frictional contact and a peculiar form of spring application, simple in the extreme. One of the early forms of toggle joint is also shown at A.

In the Commercial Motor for October 31, 1907, is shown what may be called a multi-cone clutch. This is seen in figure 26. The explanation, to be as simple as possible, is that when the clutch engages, the smallest cone seizes first, commences to revolve and subjects the spiral springs between the

next two clutches to torsional movement, which draws them together and brings the two outer cones into action; the idea being that the small clutch shall slip, tend to accelerate the car, that the medium clutch shall behave in a similar manner and that when the large clutch comes into play the three combined pick up the load and move the car.

I have said that theory did not enter into the clutch very much, but above is figure 27, which shows the peculiarity of a simple clutch embodying the tractrix curve. This curve is adopted because it is of such a form that by the figured relation of pressures and peripheral speed, wear ought to take place uniformly at all points regardless of the distance of the point from the center. The claim is made for it that the clearance required to complete the engagement is very small; that there is no wedging action between the two members of the clutch and that there is no chance for it to bind.

It is in effect a flat disk clutch which will not wear faster near its outside edge than its inside edge, but beyond that I see no gain. It would certainly require very heavy axial spring pressure, just as a

flat disk would. The matter of wear is of little moment, either with flat disks or cones. The so-called inverted cone is well illustrated in figure 28. The reversed cone is contained in an extension, A, built onto the flywheel B. When the cone is disengaged it moves toward the engine, exactly reversing the action of the foregoing type. This clutch has its adherents, and it is a good one, differing very slightly, if properly assembled, in its efficiency from the direct-acting cone. It may be kept free from dirt and oil much more perfectly than in the other form.

A simple formula for calculating the ordinary cone clutch is the following, by Charles H. Schabinger:

$$P = \frac{P f r R}{63,000 \sin O}$$

P = Assumed pressure of engaging spring in pounds;

f = Coefficient of friction, which in ordinary practice is about 0.25;

r = Mean radius of the cone in inches;

R = Revolutions of the motor per minute;

sin O = Sine of the angle of the clutch.

To obtain the size of spring when the horsepower is known, the following formula may be used with good results:

$$P = \frac{h. p. 63,000 \sin O}{f r R}$$

the same symbols being used as in the preceding formula. It will be noted that the coefficient of friction used is 0.25. This is probably near enough for a properly lubricated leather-iron clutch.

The next type of clutch may be classified as internal expanding band or ring. This has had many exponents in the motor car art, but is open to centrifugal effects to such an extent that it requires considerable ingenuity to overcome troubles arising therefrom. At high engine speeds the operating levers have been so arranged as to lower the normal expanding pressure.

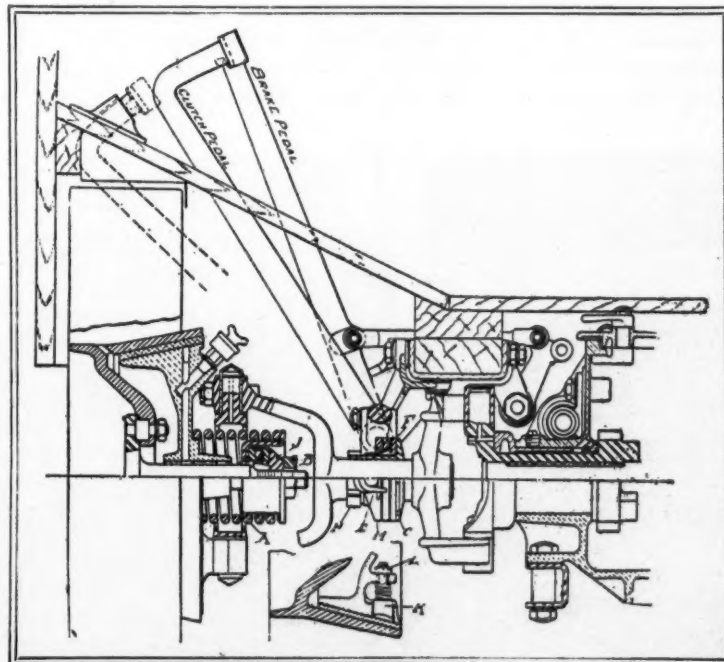


FIG. 24



THE LANCIA 15-HORSEPOWER CHASSIS WITH NOVEL FRONT AXLE AND UNIT POWER PLANT

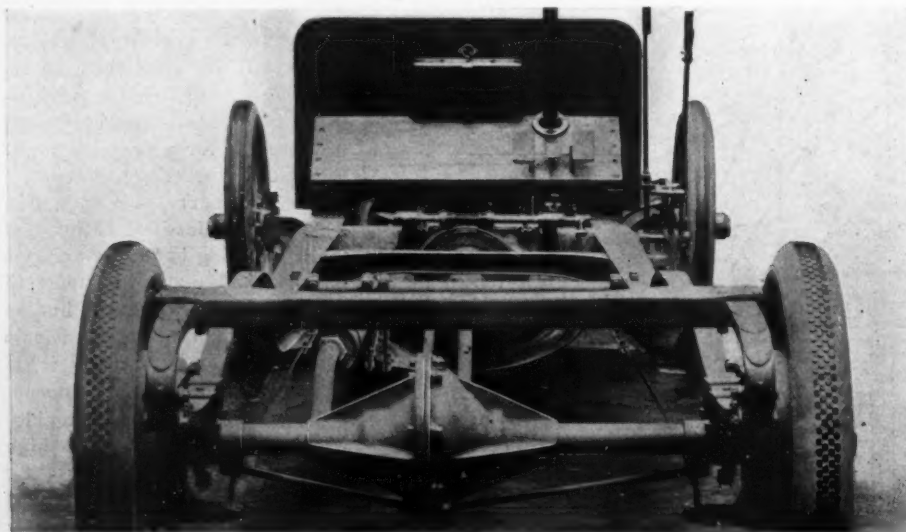
VINCENZO LANCIA, whose spectacular driving in the Vanderbilt cup race still stands as the high-water mark of fast road race driving in America, has, since he severed his connections with the Fiat house, been working on the design of a new car to carry his name. Now this new star has made its appearance in the motor-ing continental firmament. While not designed as a racing machine, it nevertheless has shown most remarkable speed, the leading design in the chassis being the securing of maximum power with minimum weight. The little machine, modestly rated at 15 horsepower, shows up a 25-horsepower at 1,400 revolutions per minute. More powerful models are being brought out, but the illustrations on these pages are those of the 15-horsepower car. One is impressed by the substantial—almost amounting to heavy—appearance of the chassis, due to the depth and breadth of the pressed steel side members of the frame. The front ends of the pressed steel side members are inset in approved style to increase the limits of steering,

and it is just behind the crank of the inset that the width of material is so great. The rear ends of the side members are set upwards considerably. A novelty in construction is the extending of the extreme rear cross member of the frame, also of pressed steel, beyond the outer edge of the side members, the projecting ends serving as brackets for the top units of the three-quarter elliptic springs. Another striking feature is the abnormal shortness of the gearbox and, of course, the gear shafts inside. The width of the gearbox, in fact, is considerably greater than its length. In spite of this four forward speeds and one reverse are provided, the direct drive being obtained by sliding one of the gear wheels into mesh with an internally toothed wheel. Gate change is fitted following conventional practice, and the shafts run on ball bearings.

The vertical engine has its four cylinders cast in pairs, with all valves on the one side and all interchangeable, suitable screw-in plugs being placed over each, those over the inlet valves accommodat-

ing the sparking plugs. The dimensions of the cylinders are: Bore, 90 m.m., or 3.5433 inches; stroke, 100 m.m., or 3.937 inches. The carbureter, which is placed on the opposite side of the engine, is of special design, with two jets, each standing in its own mixing chamber, the two jets coming into operation at a predetermined position of the rotary throttle placed above. An annular jacket surrounds both mixing chambers, through which hot water from the engine can be allowed to circulate to assist vaporization. An auxiliary air valve of the dash-pot type is fitted by the side of the throttle chamber and automatically adjusts the varying mixture conditions. The throttle is operated by a small reel incorporated in the rim end of one of the steering wheel spokes similarly to the Panhard cars, but the reel can be rotated by the forefinger alone. A foot accelerator is fitted also. Ignition is by high-tension magneto, no facilities being provided for advancing or retarding. This and the water pump are placed on the valve side of the engine and driven by gearing off the two-to-one gear wheel. Beside the carbureter on the clear side of the engine a special distributing oil pump is fitted, driven by a transverse shaft and skew gearing.

Two other very interesting features are the front axle and suspension of the engine and gearbox. The former is made of pressed steel, not of the orthodox H-section, but of U-section, like the side members of the frame, the hollow part being, of course, behind. As regards the suspension of the engine and gearbox the latter and one section of the crankcase are cast in a unit, a large open space being left between the two for the flywheel and clutch, which is of the multiple disc type. The complete unit is bolted direct to the side members of the frame in six places, three on each side. Extending arms are cast at the front of the crankcase and the rear of the gear, making four points



PECULIAR LANCIA REAR AXLE AND DIFFERENTIAL HOUSING

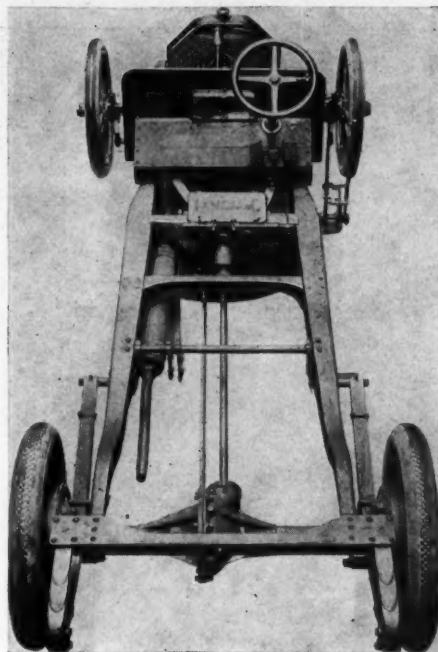
and the aluminum frame, so to speak, between the engine and gearbox, which is spread to clear the flywheel, is also attached to the side members of the frame on each side. Transmission is by cardan shaft running in a sleeve to rear live axle, which has a webbed differential case divided vertically and supported by a pressed steel torque rod. Brakes are all metal-to-metal, those on the rear wheels being of the internal expanding type and the foot brake of the contracting type operated by cams. A 30-horsepower six-cylinder model is already completed.

STEARNS MAKING TOWN CAR

In a short while the F. B. Stearns Co. will place upon the market brand new model, to be known as a town car. The new machine will have shaft drive—the first time this form has ever been employed in Stearns cars. It will be modeled a great deal after the larger car except in this one thing, and will be rated at 30 horsepower. The new model has been running for a number of months and was thoroughly tried out some time ago. The motor in the larger car has been reproduced in the smaller model, being practically the same except in size. Valve arrangement is the same, while the magneto and oiler occupy the same positions. The same complete double ignition system as on the large car is employed, with a three-speed selective transmission.

MOTOR CAR LITERATURE

A revised edition of Dr. Dyke's "Anatomy of the Automobile" has been put out by A. L. Dyke of St. Louis. The book contains 730 pages and in addition to giving hints to drivers and users of cars, it aims to furnish intending purchasers with information concerning the cars in which they are interested. In different chapters are told the constructional features of such cars as the Autocar, Cadillac, Darracq, Stevens-Duryea, Franklin, Ford, Fiat, Haynes, Knox, Locomobile, Maxwell and others. Definitions of motoring terms are given, as well as a table which points out



THE LANCIA CHASSIS

the various symptoms of trouble and how to cure them. A chapter at the end is devoted to airships.

While the inside of the catalog of the Motor Car Equipment Co. is of the conventional sort, describing various motor sundries which the New York concern carries, the cover is an artistic production in yellow and red, while the company has gone to the pains of securing an artist who knows how to draw a motor car.

Necessarily confined to conventionality by its line, still the Autolight and Motor Supply Co. of Philadelphia has produced a catalog which looks most attractive, the cover being on the blue order, with embossed letters.

The Wyeth Automobile and Supply Co. of St. Joseph, Mo., issues a neat little pamphlet descriptive of its line.

Good roads enthusiasts will be interested in the latest literature sent out by the Barrett Mfg. Co., which has branches in

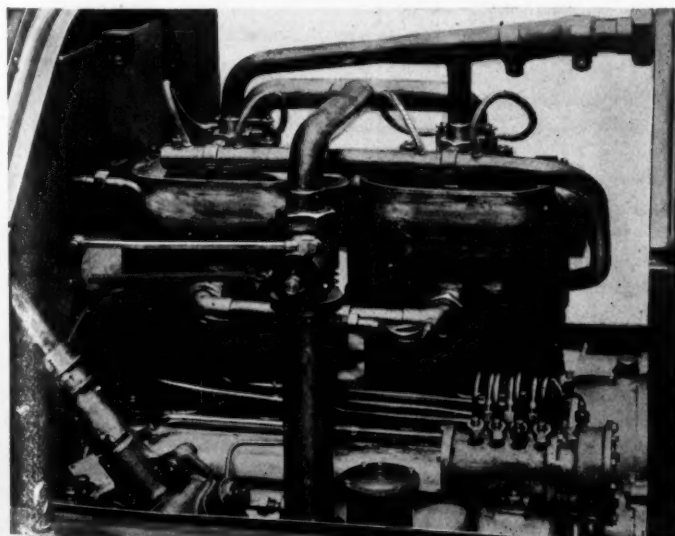
all the larger cities in the country. The pamphlet is on a "New Tarvia Treatment," and is illustrated with fascinating scenes of smooth roads, which surely would result in a fracture of the speed law if the reader was on one of the roads depicted. The Barrett company points out that in 1907 nearly 300 miles of roadway were treated with Tarvia, which, it is asserted, "is not a material used to suppress dust after the dust has been formed, but is a means of preventing the original formation of the dust."

Simplicity is aimed at by the Stewart & Clark Mfg. Co. of Chicago in its 1908 catalog, and it has attained its object. A dull blue cover with only "Stewart Speedometer, 1908," on it in gold letters makes one curious to see what's inside.

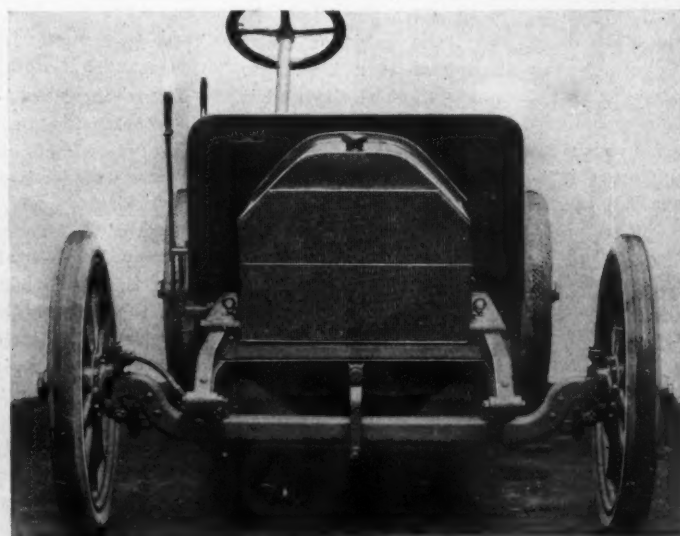
On the front cover of the catalog of the Frichtle Automobile and Battery Co. of Denver, Colo., is depicted a touring scene in which two "100-mile" Frichtle electric cars are bowling along through a picturesque stretch of country. The book, of course, describes the line and it also tells of some of the hill-climbing victories of the cars and contains testimonials from some of the users.

BUILDS PORTABLE GARAGES

The Buffalo Portable Building Co., Buffalo, N. Y., makes a specialty of garages, bathhouses, summer cottages and portable structures of every description. These buildings follow to a large extent the general conventionalities of such constructions and are shipped in sections light enough for two men to handle. The claim is made that the facility of assembling these anatomical houses is such that the owner and a boy can erect one in a couple of hours. The garages are built in various sizes and designs to accommodate the small or large car owners, as well as the motorists with ample ground room for locating the garage and the less fortunate enthusiast who must locate it in a small back yard in rear of a large city apartment building.

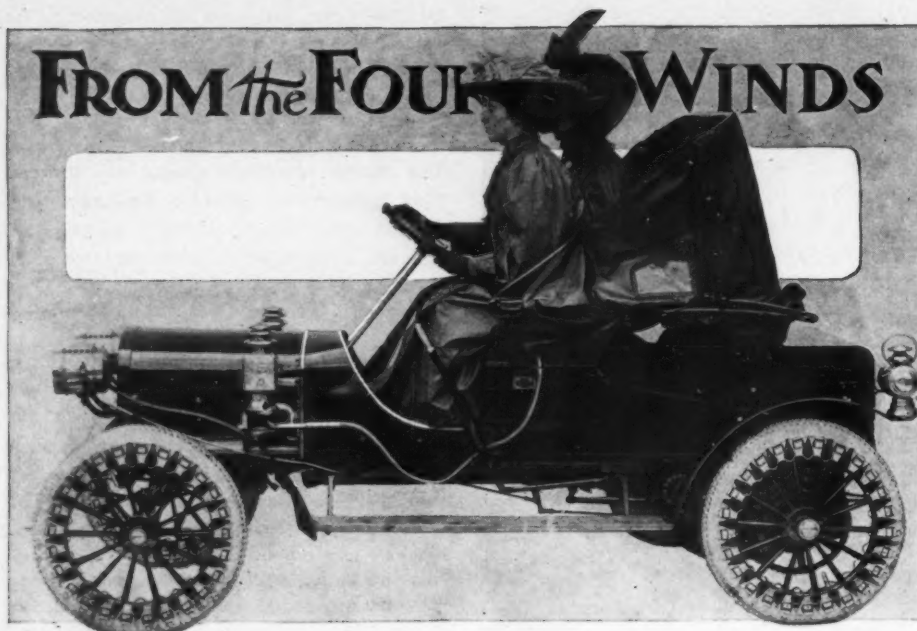


INTAKE SIDE OF MOTOR WITH OILER



CHANNEL STEEL FRONT AXLE

THE LANCIA CAR



MRS. E. E. TEAPE AND DAUGHTER ON TRANSCONTINENTAL TRIP IN WALTHAM-ORIENT

After Stealers of Cars—As the result of the depredations of persons who steal rides in cars belonging to others the Grand Rapids Automobile Club offers a standing reward of \$50 for the arrest and conviction of such persons. The offense is governed by the Michigan law.

Fines a Doctor—Since a recent decision of the municipal court in Oshkosh, Wis., Wisconsin physicians are wondering "where they are at." Dr. Neil Andrews was hurrying to a deathbed with a nurse in his car, which went a trifle faster than the 12 miles an hour set by the law. He was hauled before the judge, who rules that hastening to an emergency case is no excuse for violating the speed law. The doctor was assessed a fine of \$10.

Racine Warns Drivers—Signs for the benefit of motor car drivers are being erected on all of the country roads leading into the city of Racine, Wis. Among other things, the visiting motorists are told by the signs that the speed limit within the city is 12 miles per hour. In the past it has been the habit of many drivers to run their cars at a high rate of speed in the outskirts of the city and it is now believed that the new plan will do away with this evil. The city police department is considering the plan of purchasing two new motor cycles.

Spend Money for Roads—Numerous counties of Wisconsin are expending more this year in the interests of good roads than at any time in the history of the state. Wisconsin motorists are jubilant over the fact and it is the universal opinion that a general good roads movement is spreading over the state. The appropriations that are to be made by Rock county in the improving and building of roads and highways amounts to almost \$40,000. While the townships are to pay most of this sum, the county bears a portion of the amount and all of the work is to be done

under the supervision of the county supervisor. Leading car owners in the county have taken active steps in the matter and it is due largely to their efforts that the work is to be carried on at such a broad scale. Brown county will expend over \$14,000 in the interests of its good roads and every township except two will have its highways improved.

Careless Motorists Arrested—Several motorists of Buffalo have been arrested because their cars were not provided with drip pans for oil. According to a Buffalo ordinance, such a pan must be provided on each machine. Many in the city are of the opinion that the law is unjust in this respect and oppose it.

Will Oil Streets—Listening to the pleadings of some 900 owners of the city, officials of Indianapolis have consented to do considerable street oiling this season. To begin with, the boulevards are to have a coat of tarvia and other residence streets will be oiled if the experiment is successful. Last year the Capitol avenue boulevard was oiled, but the process proved costly and not wholly satisfactory.

Improving Roads—In Sauk county, Wis., the work of improving highways in the country districts goes merrily on, and motorists of Madison, Baraboo, Sauk City and Prairie du Sac, Wis., are happy. The township of Baraboo is macadamizing the highway from Baraboo to North Freedom, under the supervision of highways experts from the state highway commission. The town has appropriated \$3,000 and a stretch of 3 or 4 miles is being treated. The township of Sumpter is repairing roads with macadam, and the township of Freedom is spending \$1,200 in a similar manner. The road committee of the county board of supervisors of Menominee county, Mich., has just completed a tour of the roads in that territory. Last year the party became mired and had much trouble

in getting around, and this year several members of the board refused to go in motor cars until they had been assured that so much improvement work had been done that there would be no difficulty. After the trip all conceded that it was a wise move to use motor cars. Most of the roads now are in excellent condition.

Baltimoreans Indignant—The residents along Park Heights avenue, the most popular suburban highway of Baltimore, are indignant at the recklessness of some motorists and have suggested that the police should hide in stations or bushes along the route with the idea of getting the numbers of the licenses of the cars and bringing about the arrest of the scorchers. Horses have been frightened by cars speeding by and many narrow escapes from collisions have resulted in consequence of the actions of certain drivers.

Wrong Statement Made—Officials of the Baltimore sealed bonnet test, in making a statement following the run, announced that the Oldsmobile narrowly escaped a collision with a Thomas because the former slipped back while ascending a hill. This is denied in an affidavit furnished by A. L. McCormick, who states that the Olds did not stop while ascending any grade during the run, did not descend any grade or mountain backward and did not in the two times it passed the Thomas narrowly escape—or at any time during the run—a collision. McCormick claims the Olds went through the test in perfect condition.

Politicians Spend Money—To prove that Milwaukee dealers reaped no small harvest during the April election campaigns, the statements of expenses of candidates, required to be filed by all candidates under the so-called "corrupt practices act" of the Wisconsin legislature show that one candidate who spent \$6,150 to find out he was not the man for mayor, used \$500 for motor hire. Another unsuccessful candidate spent \$7,300, of which \$600 went for motor hire. The successful candidate, David S. Rose, spent \$5,150 in all, and \$500 for motor car hire. The candidates for the city council spent sums ranging from \$50 to \$200 to take speakers to meetings and voters to the polls.

Illinois Tag List Growing—Hundreds of new licenses have been issued in Illinois thus far this season. The number of new ones shows up well for the trade. In the majority of cases—in fact, nine out of every ten—where a license has been issued this year, it has been for a new car. Few have been for transferring of cars from one owner to another. The fact that the law requires an owner to register a car while in his possession once only, makes a good point in the law in favor of the owner. The false impression seemed to have gotten out that a new license is required each year and the office of the secretary of state, where the numbers and licenses are dished out to the owners, has been asked scores of times about this question. A

license once secured is good for a car as long as it remains in the possession of the person to whom the license was issued, and if the car is sold a fee of 50 cents is charged for the changing of the name of the owner on the records, providing the number goes with the car when it is sold.

Speed Trap at Amherst—Motorists have been warned to be careful while passing through the town of Amherst, N. Y., located near Buffalo. The town board has appointed two motor cycle patrolmen to watch for drivers exceeding 20 miles an hour. The roads of Amherst were frequently used, it is said, by drivers, who tested machines for car manufacturers and went at a lively rate.

No Longer a Boulevard—The almost exclusive monopoly by motor car drivers of the North Capitol avenue boulevard in Indianapolis probably will come to an end now that the city is about to turn it back into an ordinary street. The thoroughfare is the finest in that city, the only eyesore being an old iron bridge at Fall creek. The county builds the bridges and the county commissioners have refused to give the city a new bridge unless their constituents in the rural districts are permitted to drive their farm wagons over the boulevard. To get the bridge the boulevard will have to be thrown open to all kinds of traffic.

Milwaukee on Right Track—Milwaukee's metropolitan park commission is composed of men who are decidedly friendly to the motor car, and the extensive plan of improvement of city parks, highways and boulevards is greeted with delight by every owner. Country roads and streets in the outskirts are to be macadamized and made passable. The lake drive project is being pushed, and the Sheridan drive will be mapped out from the Milwaukee end. When completed there will be a motor course from Chicago to Milwaukee and beyond Milwaukee.

Smoky City Meet—Pittsburg is preparing for a track meet this week. D. P. Collins has worked up the program, and the meet will be held May 22 and 23 at Brunots Island. Walter Christie will be at the meet. The classes for the opening day have been arranged as follows: Five-mile for cars to be 20 horsepower; 5-mile for touring cars from 20 to 40 horsepower; 10-mile for touring car chassis, 30 to 50 horsepower, inclusive; 5-mile trial against time for the world's record by Walter Christie; 50 miles, a free-for-all stock touring cars. A 12-hour race for touring cars will be held on the second day. The entrance fee for this race will be \$100, and there will be \$300 added. The winner will take three-fourths and the seconds will take one-fourth of the sweepstakes. It was originally planned to make this race a 24-hour event, but owing to the fact that Brunots Island had no lighting facilities it was necessary to cut the plan down to daylight hours.

Working on Model Road—Work on the model road of the Cleveland Automobile Club, a few miles east of Cleveland along the worst stretch of highway in the state is now well under way, and probably will be completed not later than the middle of August. It will take upwards of \$30,000 to complete the work, \$25,000 of which already has been secured.

German Imports Decline—The latest government statistics show that the imports of motor cars from Germany declined from 49, valued at \$210,302, during the 9 months ending March, 1907, to 24 cars, valued at \$101,250, during the same period of 1908. On the other hand, the exports of motor cars and parts from the United States to Germany increased from \$85,508 to \$91,245 during these same periods. The balance of trade is entirely in favor of the United States.

Stops Record Runs—Action which probably will prevent any more record-breaking attempts from Grand Rapids, Mich., to Detroit has been taken by Sheriff Carroll of Kent county, who has notified all deputy sheriffs in his county to be on watch for motor car drivers exceeding the speed limit of 25 miles in the country districts. A number of runs had been planned for this summer, but these will be abandoned. Deputy sheriffs will be stationed on the principal roads at different times to catch the speed of cars. The village of East Grand Rapids is now considering an ordinance to regulate motor driving through that village. The fines are fixed as follows: First offense, \$10; second offense, \$50; third offense, jail sentence. This ordinance probably will be passed by the council. The village is on the principal road leading from Grand Rapids toward Detroit.

After Continental Record—For the express purpose of attempting a new European record, A. L. Bennett, of Worcester, Mass., and B. F. Sherman, of Brookline, who created a new record for a 4,000-mile tour of Europe and attained the highest altitude ever attained in the Swiss mountains in a motor car 2 years ago, will this June cross the Atlantic. Sherman and Bennett completed 4,000 miles in 1906 in exactly 30 days. Their tour this year will be over a different route and will be 6,000 miles in length, but in spite of the extra 2,000 miles they will attempt to make it in 30 days, with an average daily run of 200 miles. This year they will use a 50-horsepower American Mors. Bennett and Sherman will sail from Boston, shipping their car from that port, as they learned by past experiences that is the best way. There is no crating to be done when shipping from Boston, and a car so shipped is rolled off the steamer on the other side within an hour after landing. The Americans will proceed direct to Southampton via London. The itinerary of the trip is as follows, the night stops only being given: Start from Cherbourg, Paris, Dourdan, Blois, Tours,

Bourges, Cluny, Aix les Bains, Grenoble, Valence, Avignon, Marseilles, St. Raphael, Draguignan, Arles, Beziers, Toulouse, Pau, Angouleme, Tours, Paris, Saarburg, Coblenz, Weisbaden, Wurzburg, Nurnberg, Regensburg, Munchen, Seehof, Tubingen, Nancy, Paris, Rouen, Caen and Cherbourg.

Convinces the Chief—It is probable that the Louisville, Ky., fire department will be in the market for a motor patrol wagon soon since Chief J. H. Haager, of the department, has paid a visit to Indianapolis. Chief Haager was wondering how Indianapolis managed to get along with 240 officers while his city has 370. As an answer he was taken a long ride in the motor patrol, showing how quickly prisoners can be gathered up and what time can be saved in making emergency runs. Chief Haager said he would make an effort to get a motor car immediately.

Another Mileage Record—The publication of the 100,000-mile record of E. C. Andrews, Nashville, Tenn., in Motor Age a short time ago has brought to light another in the city of St. Louis, Mo. Charles W. Nugent, vice-president of the B. Nugent & Brother Dry Goods Co. of that city, wrote the Warner Instrument Co., stating that he had completed his 100,000 miles with an Auto-Meter before the end of last year. Arthur P. Warner, of the Warner company, declares his intention of starting a Hundred Thousand Club, with Andrews and Nugent as charter members.

MacDonald Gets Busy—Work has begun on many of the Connecticut roads slated for early improvement. Highway Commissioner MacDonald has awarded contracts covering construction in the towns of Willington, Saybrook and Lisbon. It is quite likely that considerable road will be treated with tar during the summer. Under the state specifications coal tar can only be applied to roads on the very hottest days, when the road bed is as dry as a chip. The commissioner is of the opinion that coal tar is the best preservative and dust layer thus far tried. Many bad spots along the main route will be repaired shortly.

Surprised the Owner—Edgar T. Dennis, of New York, recently completed a winter tour of some 3,000 miles through the eastern states, covering the worst roads in the Appalachian mountains. Before he started on the trip he gave instructions to the chauffeur to have all the tires filled with one of the patent puncture-proof compounds, as he expected to be remote from skilled aid most of the trip. The chauffeur, it seems, misunderstood the order, and failed to execute it; and was accordingly much surprised when Mr. Dennis told him to remove the two extra tires from the running board and leave them at home. The entire trip was completed without any tire troubles whatever, and it was not until the return home that Dennis learned that he had been many miles from help for weeks at a time without even a spare tube. The tires he used were Republics.



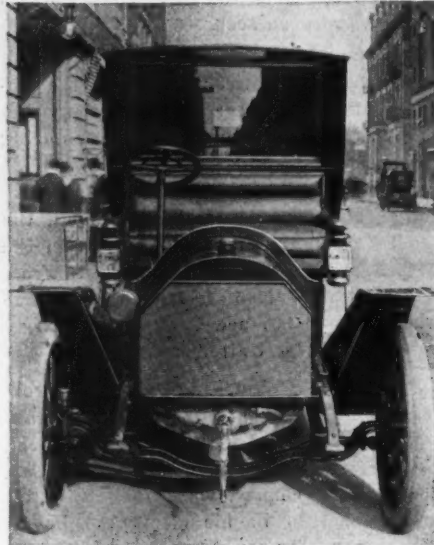
The Realm of the Commercial Car



Progress in Varied Lines

ANOTHER American car-building firm to launch extensively into the town cab manufacturing channel of the industry is the American Locomotive Automobile Co., builder of Berliet cars, which is now installing the first 100 of its cabs for service with the Waldorf-Astoria hotel, New York city. The Berliet town cab shows the company has made a careful study of the taxicab proposition, and in this connection has not overlooked the omnipresent driver trouble. To meet this squarely a few very commendable improvements have been added to the cab. The first of these is the positioning of a governor on the motor so the crankshaft cannot revolve at faster than 800 revolutions per minute, this precaution being taken in order to make the motor fool-proof against injury by incompetent drivers who might speed it too high for proper use. Not only has the motor speed been taken out of the driver's hand by the governing means, but the spark is made stationary, no advance or retard being fitted, this second precaution being taken because of the certainty of the cab getting into the hands of inexperienced pilots at one time or another during its lifetime. Both of these precautions are new in American taxicab manufacture and the results will be eagerly watched.

From a constructional point of view the Berliet town cab follows those well-known lines of Berliet models used since their construction in America, foremost among which is the employment of low-tension make-and-break ignition, with current supplied by a Simms-Bosch magneto. New, however, in this little town cab is the adoption of shaft drive, which until the present season was not employed on any of the company's models, preference being given to side chain. Last fall announcement was made of a small shaft-driven



BERLIET TOWN CAB

chassis and now the town cab comes as the second shaft-driven member of the Berliet family. In connection with shaft drive must be noted the employment of a particularly rigid rear axle in which the load-supporting parts consist of a one-piece forging, comprising a large central ring for the differential and end tubings for carrying the axle drive shafts, these tubes being ribbed on top and bottom with the central ring to increase the supporting strength. The spring seatings and brake carries are formed integral and mounted rotatively on the axle. Braking torque is absorbed through the springs and driving torque through strut rods connecting from the axle tubes to the side members of the frame.

In lubricating the motor provision is made for enough but not too much crank-

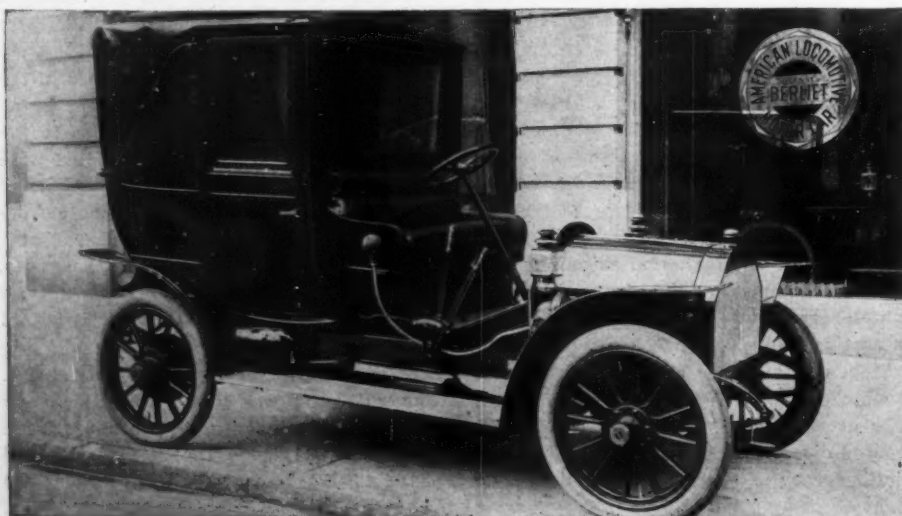
case splash, the scheme to care for this supply being the introduction of hollow vertical plugs in the base of the crankcase, the tops of which plugs are on a level with the required crankcase oil level, so all additional oil drains off through these plugs back to an overflow tank.

The specification features of the cab are as follows: Horsepower, 16 at 800 revolutions per minute; bore, $3\frac{1}{8}$ inches; stroke, $4\frac{3}{4}$ inches; wheelbase, 103 inches; tread, 55 inches; frame height from ground, 24 inches; weight, 2,600 pounds; frame width, 34 inches; distance from dash backwards, 98 inches. Wheels are 32 inches in diameter front and rear and carry 4-inch tires. The motor is of the four-cylinder type, housed under a forward bonnet; a multiple disk is interposed between the motor and the three-speed selective gearset. Cooling is by cellular radiator and centrifugal water pump.

SERVICE IN WASHINGTON

The Federal Taxicab Co. has established a service of taxicabs in Washington, D. C., using Thomas taxicabs. The service has made a pronounced hit in the capital city and the number of cabs in use is to be increased from sixteen to forty within the next 30 days. The company has secured a number of desirable contracts for furnishing cab service, particularly for the Metropolitan club, the principal hotels and for the Washington Terminal Co., which operates the new Union railroad station. W. F. Thomas, a brother of E. R. Thomas, president of the Federal Taxicab Co. has just succeeded Robert A. Parke as general manager of the company. The Union Garage Co. has established a taxicab service in Washington, D. C., in which six Elmore taxicabs are used. It is proposed to increase this number shortly.

As a result of the introduction of taxicab systems in Washington, D. C., the authorities of that city have amended the regulations governing cabs, the amendment providing for the regulation of these public vehicles and fixing a standard schedule of charges for them. The schedule of rates for motor taxicabs is as follows: For one or two persons, 30 cents for the first $\frac{1}{2}$ mile and 10 cents for each $\frac{1}{4}$ mile thereafter, with 10 cents for each 6 minutes of waiting. Children, not exceeding two, under 5 years of age, accompanied by adults, shall be carried free. When one child between 5 and 12 years of age is accompanied by an adult it shall be carried free. For three, four or five persons, 30 cents for the first $\frac{1}{2}$ mile and 10 cents for each $\frac{1}{4}$ mile thereafter, with 10 cents for each 4 minutes of waiting. Children, not exceeding 2, under 5 years of age, accompanied by



SIDE VIEW OF NEW BERLIET TOWN CAB FOR GOTHAM SERVICE

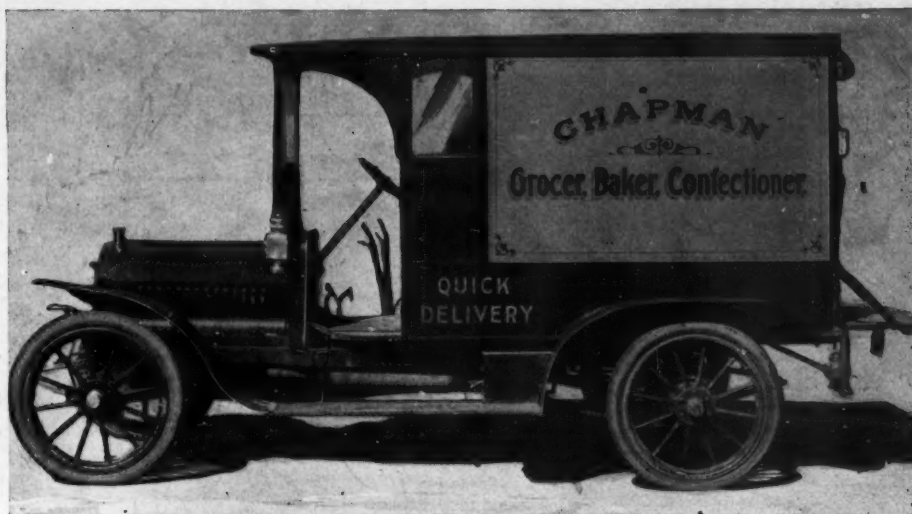
adults shall be carried free. When two children between the ages of 5 and 12 years are accompanied by adults they may be counted as one full fare. Children over 12 years of age are to pay full fare.

For ordering a cab each mile or fraction thereof from a point half a mile from stand or station to point ordered, 20 cents. Within $\frac{1}{2}$ mile limit no extra charge shall be made. All passengers shall be entitled to have conveyed without charge such baggage, luggage, or small packages as can be conveniently carried within the vehicle. For each trunk, valise or bag carried outside the vehicle the charge may be 20 cents. Rate cards must be posted in each vehicle informing passengers as to the methods of computing their fare, the rate charge and any privileges they may be entitled to. All provisions of existing law or regulation not inconsistent herewith are made applicable to taximeter motor cabs.

Under the terms of a bill just introduced in congress sightseeing companies in Washington, D. C., will be required to procure franchises for conducting their cars through the city, which will place them on the same plane with street railway companies. It is maintained by the city authorities that the two businesses are analogous, and that the sightseeing motor car companies should be required to obtain franchises, in order to insure that the District of Columbia will receive taxes on the cars. The object of the proposed law is to prevent a transitory business of carrying passengers upon such occasions as presidential inaugurations and conventions, or even during the summer.

BUSINESS RIGS IN BOSTON

One city in the country in which commercial vehicles are making rapid strides is Boston. The Motor Age representative spent half an hour on one corner of the downtown district a few days ago, just to note how many horseless vehicles were moving about on an average day. The results were surprising. There was a motor ambulance from the city hospital; two vehicles from savings banks passed; two



SERVICEABLE TYPE OF DELIVERY WAGON FOR GROCERY TRADE

wagons used by restaurant firms were noted; flower stores were represented by five; there were eleven cars from dry goods stores; the electric lighting company had two; there was one of a firm that deals in door and window sashes and another of a furniture store. This by no means represents a total, but by observing so many in such a short space of time it gives a very good inkling as to how the vehicles are increasing in public favor.

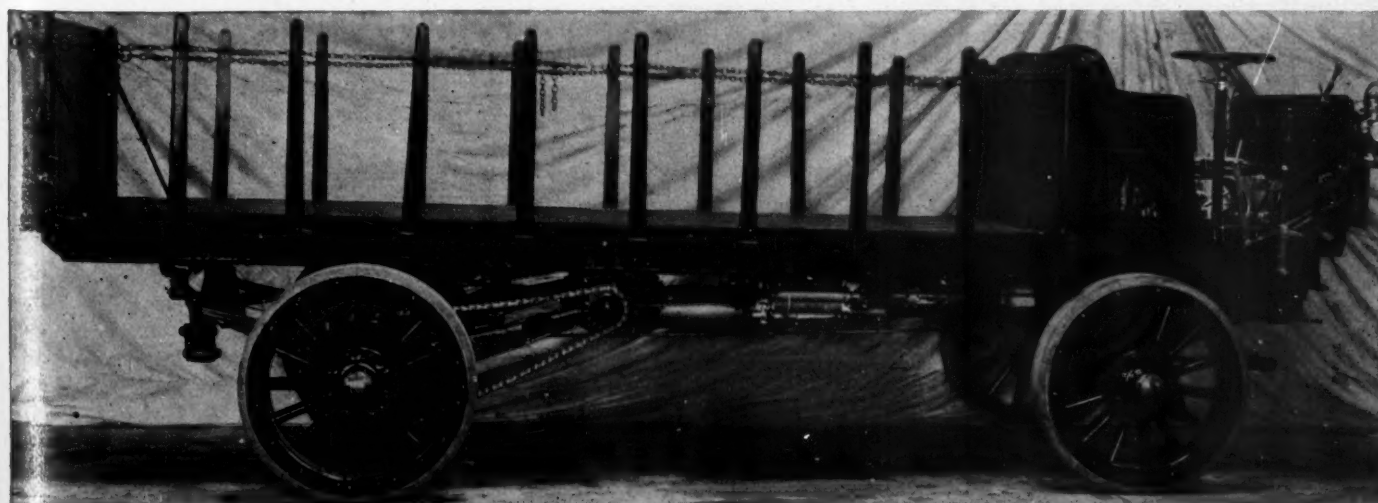
FRAYER-MILLER TRUCK

Following the successful introduction of its 3-ton air-cooled truck, the Oscar Lear Automobile Co., Springfield, O., is placing before the buying public a 50-horsepower air-cooled 5-ton truck, which the company is prepared to furnish with body styles to suit the desires of buyers. The ignition system employed on the four-cylinder motor fitted in the truck is the Atwater-Kent device. In general design the truck contains few unconventional parts, it following that well-known idea in which the motor is placed forward beneath the foot-board and seat. In the rear of it is a four-speed selective gearset, rendered conspicuous by the use of Hess-Bright bearings and special steels, as well as by the

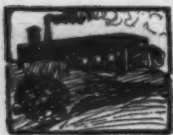
employment of gears with six pitch and 1-inch face. The gearcase is of the barrel one-piece aluminum type, with removable end plates. Final drive is by side chains to 36-inch wheels carrying $3\frac{1}{2}$ -inch twin tires. The front wheels, 36 inches in diameter, carry 4-inch single solid rubber tires. The car's wheel base measures 130 inches, its tread is 66 inches, the rear axle is a steel member made square in cross section and measuring 3 inches to the side, whereas the forward axle is of the I-beam type. The channel steel frame has side member 6 inches in depth with 2-inch lips. These parts are well braced and a sub-frame carries the power and transmitting parts.

GROCEER IS ENTERPRISING

The accompanying photograph shows how a leading grocer in Minneapolis delivers his goods. The car is a four-cylinder of special design built by the H. E. Wilcox Motor Car Co., manufacturer of the Wolf. The delivery wagon has a 25-horsepower engine and R. E. Chapman, the owner, declares it is a success in every particular. The car has been in operation 3 months and has traveled 3,500 miles without repairs, except of a minor nature.



FRAYER-MILLER, 5-TON STAKE TRUCK WITH 50-HORSEPOWER MOTOR



Among the Makers and Dealers



CRESCENT CITY AUTO CO.'S GARAGE IN NEW ORLEANS

Building New Garage—The Auto Exchange, agent for the Jackson in Milwaukee, is building a modern garage. The company is in temporary quarters at Fourth and Prairie streets.

Joins Crawford in Business—George H. Lowe, of Boston, has formed a partnership with R. S. Crawford, of Hagerstown, Md.; maker of the Crawford car, and the firm will handle the Crawford in Boston at 173 Huntington avenue.

Dinner for Redden—Charles F. Redden, sales manager of the Studebaker company in New York, was given a dinner in Boston a few nights ago that impressed him with the hospitality of the Hub people. R. A. Daniels, Boston manager of the Studebaker, was toastmaster and the other guests present comprised the motor writers of the Hub.

Automatic Tire-Filling Valve—The Warner Instrument Co., manufacturer of the Auto-Meter, has placed on the market an automatic acting tire-filling air valve. It opens by being brought into contact with the tire valve. It is claimed that with 100 pounds' pressure on the tank, this valve will fill a 4-inch tire in 15 seconds if the tire valve is in good condition.

Maxwell Output—An inkling of the manner in which the motor cars are being sold in this country was given by President Benjamin Briscoe of the Maxwell-Briscoe company while he was visiting Boston as the guest of F. J. Tyler last week. "This year we shall deliver 4,800 cars," said Mr. Briscoe, "but to meet the demand that is in sight for the next season our company will put out 12,000 machines. At Newcastle and Tarrytown we are working day and night shifts and put-

ting men to work as soon as we can get hold of skilled machinists. There has been a tremendous boom in motoring circles since the warm weather set in."

Tradesman Recognized—T. W. Meacham, president of the New Process Raw Hide Co., has been elected president of the chamber of commerce of Syracuse, N. Y., in which city the New Process Raw Hide Co. is located.

Big Mitchell Shipment—The Mitchell Motor Car Co., of Racine, Wis., last week made the biggest shipment in its history. A solid train of fifteen freight cars went out of the yards at Racine, bearing the Mitchell to all parts of the country.

Electrics for One-Armed Men—The versatile one-armed man has added driving to his list of accomplishments. The Pope Motor Car Co. has built several Pope-Waverley electrics for one-armed men. The only necessary departure from the usual construction is the arrangement of an extra pedal, with ratchet effect, instead of the usual hand lever for controlling the current. The steering is done with the usual side lever.

Peerless Product Placed—The Peerless Motor Car Co. declares its entire output sold out with actual specifications and deposits made on the complete season's production of both four and six cylinder cars. The Peerless company claims it has maintained one of the largest factory forces, in proportion to its force under normal conditions, in comparison with other industries in Cleveland during the unsettled financial conditions existing before the first of the year. Over 85 per cent of the maximum working force has been operated full time since January 1,

1908, and practically its entire complement of men on full time during March, April and May, with the result that these months establish a high record of production in the history of the company since it began the manufacture of motor cars at its Cleveland plant.

New Company in Wisconsin—The Marvel Motor Works has been formed at Algoma, Wis., with a capital stock of \$30,000. The company will manufacture a new motor and gasoline engine for marine and motor car use.

Indianapolis Move—The building recently vacated at 23 East Ohio street, Indianapolis by Finch & Freeman, has been taken by the Knickerbocker Auto Co. and the Columbia Electric Co., of Knightstown. The former company will conduct a garage and repair shop, while the latter will again have a sales agency for the Leader cars in Indianapolis under the management of F. E. Kleinmeyer.

Monarch Company Election—The annual meeting of the stockholders of the Monarch Motor Car Co. of Chicago Heights, Ill., was held at the Chicago Automobile Club. The old directors, consisting of P. M. Hanney, Evan A. Evans, M. H. Kilgallen and T. A. Quinlan, Jr., were re-elected and the directors added were R. J. Gunning, F. A. Moody and Rush C. Butler. The directors re-elected T. A. Quinlan, Jr., president and general manager and J. A. Ward secretary and treasurer.

Continental Issues Warning—A warning is being sent out by the Continental Caoutchouc Co. in regard to the use of the term "Ready-Flated" in connection with motor car tires or rims. Says the company: "This term, 'Ready-Flated,' is a registered trademark and can only be used as a name for the goods made by the Continental company. It is a coined term and has been duly entered in the United States patent office. 'Ready-Flated' designates a Continental tire carried already inflated on a Continental rim."

Prest-O-Lite for Airships—Lighting equipment for airships is the latest product of the Prest-O-Lite Co. Aeronaut H. B. Wild, who has been making ascensions in his airship, has made arrangements with the makers of Prest-O-Lite tanks for a complete lighting and signaling outfit. The gas storage tank is made of aluminum, specially treated to give high tensile strength, and keeps the searchlight supplied for 20 hours. The lamp also is aluminum, and, in addition to its use as a searchlight, is fitted with shutters for "wig-wag" signaling, and red and green shutters for emergency signals. The total weight of the tank and powerful searchlight is only 34 pounds.



News from the Motor Clubs



Selects Orphans' Day Date—The Quaker City Motor Club, of Philadelphia, has selected Wednesday, June 10, for its annual orphans' day run.

Baltimore After Cars—The Automobile Club of Maryland, through Secretary E. A. Dolle, has sent out circulars to 1,149 owners in Baltimore and the suburbs, requesting them to contribute their cars for the orphans' outing which will be held in this city, Wednesday, June 10. There are 1,500 of these boys and girls in this city. The outing committee consists of C. Howard Millikin, chairman; Dr. H. M. Rowe and Frank W. Darling.

Wildwood Elects—The regular annual meeting of the Motor Club, of Wildwood, N. J., was held last week. The following officers were elected to serve during the coming twelvemonth: President, Philip P. Baker; vice-president, Evans G. Slaughter; secretary, V. G. Reynolds; treasurer, J. Thompson Baker; racing secretary, H. L. Hamersley; trustees, Thomas S. Goslin and John Bright. Arrangements were made for holding a series of races during the summer, the first of which will be pulled off on July 4 over the Central avenue boulevard.

Speed Trap Warnings—The Automobile Club of Philadelphia is publishing from time to time warning notices in the papers calling attention to the location of police traps, and urging all motorists to co-operate with it by keeping within the legal speed limit at all times. Where, as is often the case, these traps are established "for revenue only," the club, through its legal committee, promises to do all in its power to put a stop to the imposition. It calls particular attention to a stretch between New Brunswick and Highland Park, on the main route between Philadelphia and New York, where the means employed and the treatment accorded motorists "give every appearance of being designed as a means of collecting revenue."

Logs Stop Motorists—Effectively barred by order of the park commissioners from entering Institute park at Worcester, Mass., motorists are up in arms against what they term an outrage. The signs barring the motors have been placed at all the entrances to the park within the past few days by order of the park commissioners. And that the order directing them to keep off the finely kept roads which wind through the pretty park is obeyed to the letter, logs are set up squarely across the entrances to the park. In the photograph is shown Worcester's copy of the noted Newport tower and the park commissioners have barred the poor old public of Worcester from this on the ground that it is unsafe. This tower is



EFFECTIVE WAY OF STOPPING MOTOR TRAFFIC AT WORCESTER, MASS.

now fenced off and the public can look at it. The park and tower were given the city of Worcester by the late Stephen Salisbury.

Record for Boston Man—Eben W Hutchins, a Boston attorney, returned last week from abroad after having completed a motoring trip on the continent of 7,000 miles during the past winter. This is the record for a single trip by one Bostonian, it is claimed.

Minnesota State Roads—At the annual meeting of the Minnesota State Automobile Association the following officers were elected: President, Frank M. Joyce, Minneapolis; vice-president, Reuben Warner, St. Paul; secretary and treasurer, Dr. W. H. Card, Minneapolis. The annual dues of club members were raised to \$1 per annum. The old rate was 50 cents. C. H. Kohler, chairman of the legislative committee, presented a report in which he recommended a tax of \$10 or \$20 on every motor car in the state, the money thus raised to be devoted to the making of good roads. The association favored legislation along this line.

Lowell Road Race—The Lowell Automobile Club, under whose auspices the Massachusetts road race is to be run July 4, has secured the permission of the town authorities of Tyngsboro for the cars to pass through that place on the date of the race. At a meeting held a few nights ago it was decided to make the race 250 miles instead of 200. Final arrangements were made as to policing the course with members of the state militia. On the holiday the militia may turn out for an early parade and afterward they will act as a patrol. The race has given the club a big

boom, for it has jumped its membership up within the past week from below fifty to more than 100 members. Frank S. Corlew was given charge of the publicity and he will open headquarters in Lowell.

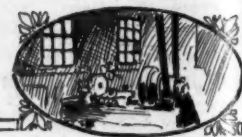
Two-Wheelers Organize—The Indianapolis Motor Cycle Club, recently organized, but which now has thirty members, has established permanent club headquarters at 119 West Maryland street. Plans are under way to increase the membership to fifty by July 4 and two race meets for the near future are being planned.

Meet at Logansport—The Logansport Automobile Club, of Logansport, Ind., is arranging a parade and a racing program for drivers for July 4. A similar event was held last year and thirty-five cars were in line. There are now sixty-six machines in the city and it is expected the number will grow to 100 before the close of the season.

Hits Tire Men Hard—There is an animated fight on in Baltimore between the dealers and members of the Automobile Club of Maryland, because the club has gone into the tire business. It is purchasing tires in large quantities direct from the factories and selling them to its members almost at wholesale prices. The dealers, in consequence, have sent up a howl, claiming the action of the club ultimately will ruin their business. They, moreover, feel the club is treating them unfairly for the reason many of the local dealers were prime movers in the formation of the club. At present 200 local car owners are members of the club, and with the added inducement of getting tires at nearly wholesale prices there is every reason to look for an increase in membership.



Motor Car Shop Kinks

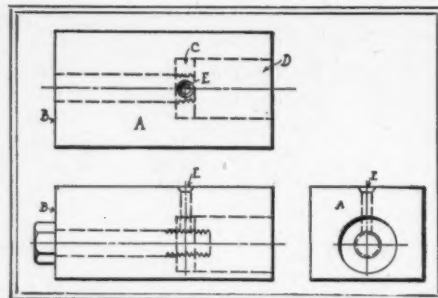


RE-RIVETING AN OLD FRAME

Nothing is commoner, when an old machine is turned into the shop for overhauling, than to find that a large proportion of the rivets have loosened or partly sheared in their holes. As this condition furthers the natural flexibility which every well ordered motor car frame should have, it might not at first seem objectionable, but it results in throwing undue strain on the rivets which still hold fast, and when a rivet exposed to vibration has begun to shear or enlarge its hole, it is not easy to say where the process will end. Consequently every old machine should be carefully examined when stripped for signs of looseness around the rivet heads. It is useless to attempt to tighten up the old rivets. They will be as loose as ever in a few hundred miles and will break all the easier. The only thing to do is to cut out every loose rivet, ream the holes if they have enlarged—as they probably have—and put in new rivets that will thoroughly fill the holes. As fast as the holes are reamed bolts or taper pins should be put in to hold the frame members from slipping, while the other holes are being reamed and the rivets are being set up. The rivets must be put in hot, and if they are small the only way to accomplish this is to do the riveting beside the forge, or to heat the rivets in a kerosene torch or soldering iron heater placed for that purpose at the side of the work. It is of the first importance that the rivets when set up shall fill the holes, and if it is necessary to ream the holes to the next larger size this should be done.

SHAKE IN ENGINE BEARINGS

The permissible wear in a crankshaft or crankpin bearing is a question of two things, namely, knocking and the spring of the shaft. In the crankpin bearings only the former has to be considered, and regarding this it may be said, as a general thing, that if the reciprocating parts are as light as they should be and the spark is handled with intelligence the crankpin bearing can be allowed to wear as much as ten one-thousandths of an inch loose before it is necessary to take it up. This is due to the fact that in a properly designed engine the shake is taken up by the compression before the spark occurs, except when the throttle is nearly closed, and in the latter case the combustion is too slow to act as a hammer blow. Of course such a degree of looseness is not permissible in a car in unskilled hands, or if the reciprocating parts are more than usually heavy, and of course actual knocking cannot be tolerated. On the other hand a clever driver can avoid knocking when the bearings are even looser than the above. As regards the crankshaft, the question of



JIG FOR DRILLING OF COTTER PIN HOLES

relative wear of the bearings is important, since if one bearing wears down materially faster than the others the shaft must spring under the explosion of the cylinder. For this reason it is safest to put the permissible looseness in the main bearings at five one-thousandths of an inch. If the engine is of the double opposed type the shaft oscillates from side to side with the explosions, and will pound with a smaller shake than the above. If the engine is of the special design having ball or roller bearings at the ends of the crankshaft and plain intermediate bearings the latter must not be allowed to wear more than two or three thousandths loose. The crankshaft is still the part of the modern motor car most liable to breakage, and it can hardly be questioned that the greater number of breakages are caused, not by fatigue of the metal due to the explosions themselves, but by abnormal stresses imposed on it, partly by the bearings wearing out of line, and partly—in those engines which are supported directly on the side members of the frame—by distortion of the crankshaft itself, due to springing of the frame on rough roads.

FITTING TWO KEYS

Occasionally one finds that a gear or lever keyed on its shaft has become loose, owing to the key being too small or the shaft too soft to hold. Sometimes a new and slightly larger or better fitted key will cure the trouble, but in case the key is found to sink into the shaft or the gear hub a second key at right angles to the first is required. It then becomes necessary to make sure that both keys are a tight fit. This is best insured by fitting one key first and scribing a keyway on the shaft to match the other key seat. The second keyway is then chipped out and filed true. Of course if one has a milling machine and an index head this procedure is un-



necessary. It may be remarked that a hub held on a shaft by a single taper pin will often work loose in the same way, and the remedy is the same, namely, a second pin at right angles to the first and a little further along the shaft. The first hole should be reamed out true and the new pin driven in, after which the second hole is drilled and reamed.

DRILLING COTTER-PIN HOLES

Frequently it is desirable to locate a cotter pin hole in the end of a bolt with considerable accuracy, and this cannot be done by means of a scale and prick punch. The drill tends to creep lengthwise of the bolt owing to the threads, and to run side-wise also, unless it is held in a jig. To prevent this the small jig, illustrated herewith, answers the purpose. A block of cast iron A is faced square at one end B and drilled horizontally to the bolt hole size. A short bushing C of hardened tool steel is driven up to a shoulder in the recess D. This bushing is threaded to receive the bolt, and contains the vertical hole E for the drill. The distance from E to the face B is the distance from the bolt head to the cotter-pin hole, and the bolt is simply screwed home, as the cut shows, and then drilled.

USES OF COMPRESSED AIR

The most obvious usefulness of compressed air in a motor car repair shop is to inflate tires; but a good supply of air under pressure, piped to the places where it is needed, will be found a time-saver in many other ways. For example, nothing else cleans so quickly the parts of a car taken down for repairs. Drop them in a pan of kerosene, scrape off the caked dirt, dip them again, and hold them in a jet of compressed air. Presto! they are as clean and dry as if they had been washed with gasoline and a paint brush and dried by hand. Annular ball bearings are apt to resist the cleansing efforts of gasoline, and nothing else will reach the minute chips and particles of dirt between the balls but that same forceful jet of air. It does in a moment what a cleaning brush does in minutes, and it reaches where neither brush nor swab will go. Again, a sharp jet of air will keep a grinding wheel and its work cool where water cannot be used; and a light jet will blow the chips from a milling cutter and give the machinist a chance to see the work without pausing to use a brush. Every milling machine should have its flexible air tube where it can be put into service at any moment. Where brass is being turned, a stiff jet of air aimed just above the tool point will prevent the chips from flying all over the shop, and will make it easy to collect and save them. And air can be used where



Brief Business Announcements



Cleveland, O.—The Metropolitan Motor Car Co. has been appointed local agent for the Knox.

Chicago.—S. E. Wherritt, manager of the Pierce Engine Co., has removed from 1421 to 1507 Michigan avenue.

Las Vegas, N. M.—M. Biehl and M. H. Hiller have formed a partnership and will open a garage in the Nolan building.

Newark, N. J.—The plant of the Frayer-Miller Auto Co. was damaged by fire on May 4. The loss was \$2,500, with no insurance.

Chester, Pa.—A motor transfer company has been organized here by J. J. Buckley, J. J. Ryan and others. It is to compete with the Chester Traction Co.

Cleveland, O.—George Baumetz has been appointed agent for the Overland, a newcomer in the local field. Later on Mr. Baumetz will represent the American and the Marion cars.

Wheeling, W. Va.—Wesley House and E. J. Becker have formed a partnership and have opened a garage at Eighteenth and Chapline streets in the old quarters of the Wheeling Storage Co.

Newark, N. J.—The Weldon & Bauer Co., successor to the F. E. Boland Co., has removed to the new building at 200-202 Halsey street. It will continue to represent the National and Correja.

Los Angeles, Cal.—The Maxwell-Briscoe Co. has established an agency at Redlands with S. F. Boynton & Sons. Rialto and San Bernardino are to be included in the territory covered by the new agency.

Los Angeles, Cal.—A. D. Ostrander, formerly the proprietor of the Lambert garage, has opened the Auto Livery garage at 1212 Main street, where he will do a general renting business, and will also deal in second-hand cars.

New York.—The Ciglia Shock Preventor Co. has been incorporated with a capital stock of \$100,000 to manufacture articles pertaining to motor cars, boats, etc. The incorporators are E. F. Ciglia, L. F. Pelletier and J. W. Samuel.

Pittsburg, Pa.—Barney Oldfield is to assume the management of the Highland Automobile Co. in the near future. W. J. Murphy, who has been acting as manager since the resignation of W. A. Richwine some months ago, will resume his old position as demonstrator and salesman.

Minneapolis, L. I.—An order has been issued resuming the Hillside Motor Car Co., of Jamaica, from increasing the capital stock of the company to \$50,000, and the board of directors from three to eleven. According to the order issued by Justice Seudder, the company can increase the directors to

five, but the other matters, it is said, are to be held in abeyance.

Albany, N. Y.—The Jamaica Motor Car Co. has been incorporated with a capital stock of \$1,000.

Hartford, Conn.—George D. Knox, of 210 Pearl street, is to represent the Peerless during the coming season.

Indianapolis, Ind.—The Simplex Motor Car Co., of Mishawaka, has increased its capital stock from \$100,000 to \$200,000.

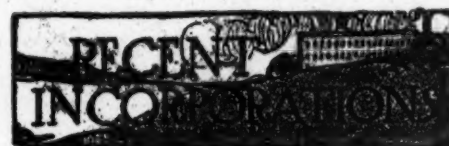
Birmingham, Ala.—The Southern Garage Co. has been incorporated with a capital stock of \$2,000, and will do a general motor business.

Albany, N. Y.—The American Carburetor and Improvement Co., of Brooklyn, has been incorporated with a capital stock of \$25,000, and will deal in general fuel carbureters.

Cleveland, O.—A new garage has been opened at Detroit and Hird avenues, to be known as the Lakewood garage. It is to be under the management of H. Hersch and H. Greenburg.

Highland, San Bernardino County, Cal.—A partnership has been formed by Green & True for the purpose of opening a new and up-to-date garage in this town. It is likely the new building will be located in the vicinity of the bank on Palm avenue.

Providence, R. I.—R. H. Millsbaugh and J. A. Meyer formed a partnership and will act as agent for Selden and Lozier in Rhode Island and Fall River. It is to be known as the Selden Motor Car Co. and will be located in the Aborn street garage



Jersey City, N. J.—Sterling Vehicle Co., capital stock \$300,000, to manufacture motor cars, motor boats, etc. Incorporators, H. O. Coughlan and L. H. Gunther.

Albany, N. Y.—Walton Motor Co., of Lynbrook, capital \$10,000, to manufacture cars, carriages, vehicles, boats, etc. Incorporators, J. N. Walton, E. N. Smith and G. F. Hickey.

New York.—S. Healey Co., capital stock \$20,000, to manufacture cars, carriages, wagons, boats, vehicles, etc. Incorporators, H. T. Jennings, J. W. McCabe and Sumner Healey.

Springfield, Ill.—American Puncture Proof Tire Co., capital stock \$60,000, to manufacture and deal in puncture-proof rubber tires. Incorporators, G. Dixon and H. S. Osborne.

Rome, N. Y.—Willex Mfg. Co., capital stock \$10,000, to deal in supplies, gasoline engines, etc. Incorporators, D. F. and John Willex and C. Schreffler, all of Rome.

Boston, Mass.—General Automobile Co., capital stock \$1,000. Incorporators, L. M. Cotton, L. B. Cardill and L. W. Peters.

Altenport, N. J.—Atlantic Coast Garage, capital stock \$125,000, to store motor cars, deal in real estate, etc. Incorporators, W. F. Wood, J. F. Padelford.

Chicago.—Auto Taxicar Co., capital stock \$30,000, to do a motor livery business and operate a garage. Incorporators, C. E. Selbeck and R. E. Howard.

at 179 Aborn street. John T. Sutcliff is to act as manager.

Newark, N. J.—The Linkroum Automobile Co., agent for the Lozier, has removed to 239 Halsey street.

Boston, Mass.—The Gay Automobile Co., of Brockton, has been incorporated with a capital stock of \$10,000.

Pittsburg, Pa.—The Robbins Electric Co. has added to its accessory business a complete plant for charging storage batteries.

Laurel, Del.—A motor bus line has been started between this town and Seaford, and eventually will be extended to other towns in Sussex county.

New York.—Schedules in bankruptcy of the Kalb & Berger Mfg. Co., repairer at 520 East Seventy-second street, show liabilities of \$7,764 and assets of \$4,825.

Philadelphia, Pa.—Plans are under way for the organization of a taxicab company in this city. Three local capitalists, whose names have not yet been made public, are back of the concern.

St. Louis, Mo.—Benjamin Gerdelman has been appointed local representative of the Jones Speedometer Co. He will continue to look after the interests of the Witherbee Igniter Co. as well.

New York.—M. Edwards, who formerly was in charge of the local branch of the Electric Vehicle Co., has been appointed manager of the electric department of the Studebaker company.

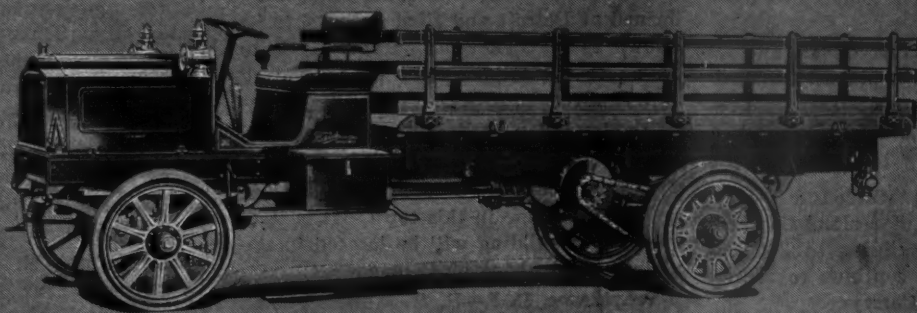
Glens Falls, N. Y.—The Glens Falls Automobile Co. has elected the following officers: President, E. F. Irish; vice-president and secretary, W. I. Griffing; treasurer, W. L. B. Durkee, of Fort Edward.

Cleveland, O.—Frank Coleman is to open a store at 1922 Euclid avenue, where he will act as local representative of the Akron Pneumatic Tire Co., of Akron. He is to have the agency for this company throughout the entire state, with the exception of the cities of Akron and Cincinnati.

Mexico City, Mex.—The Mexican Electric Omnibus Co. has started its service between the Zocalo and the Colonia Roma. Ten trips a day each way are to be made, and it is expected that there will be a steady run of business from the start. L. C. Brown is the general manager of the company.

Tempe, Ariz.—The Coey Taxi Cab Co. has filed articles of incorporation with a capital stock of \$500,000, and will run bus and livery business, as well as doing a general motor car manufacturing and mercantile business. Charles A. Coey, Charles E. Gregory and Benjamin Levering are the incorporators of the company.

Packard TRUCK



Normal load capacity, 3 tons.
Price in standard equipment and finish,
\$3,850, f.o.b. factory.
Special bodies to order.

